

Rush Van Zile M.D.

avec les respects de

Chas A Dubouché



THE
FAMILY DENTIST;
INCLUDING THE
SURGICAL, MEDICAL,
AND
MECHANICAL TREATMENT
OF THE
TEETH.

Illustrated with Thirty-one Engravings.

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BY  
CHAS. A. DU BOUCHET, M.D.,  
DENTAL SURGEON.  
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PREFACE.

IN submitting the following Work on the Teeth to the suffrages of the public, the author may be allowed to make a few remarks in explanation of its nature and scope.

If it be right to measure value by utility, then the teeth will take high rank among the parts of our outward system. For their offices are sufficiently universal. Thus they perform the first process on the food, being indispensable to adult digestion; and by comminuting the same, they minister to the sense of taste, which is null and void unless objects be reduced to a size adequate to the gustatory sensoria: moreover their sound-

ness is essential to comfort in eating: and again, their healthy state and regular position are requisite to beauty in man and woman, and to the perfection of the voice. These considerations, which might easily be extended, are enough to justify any one in making the teeth a distinct object of attention.

Without desiring in any way to disparage the admired labours of others, we have, in our work, endeavoured to supply a deficiency in placing before the public a popular text-book of Dentistry: and it has also been our aim to write in common terms wherever it was possible. For the time has come when the arts and sciences should be appreciated by the public, which will hardly think worse of the professions for ceasing to speak an unintelligible language.

Part I. of the work contains the anatomical and surgical department of the dental art; and teaches the means of treating the teeth when diseased, of turning them to the best account in cases of partial decay, and

otherwise of keeping them in health and beauty. Part II. illustrates the various modes of inserting artificial teeth. The illustrations, which are numerous, are particularly necessary, as some of the subjects and cases which have occurred to the author in the course of an extensive practice, and which he desires to place prominently before the reader, are, it is believed, new, and could not so well be understood by a bare description.

In conclusion it may be observed, that the importance of the dental art, and the consequent success of skilful dental practitioners, has attracted into the profession a number of persons of dubious character, who are rather studious of gain, by whatever means obtained, than of honestly practising their assumed calling. Dentistry, however, is not peculiar in this, for it is a common complaint in all professions. The fact has distinctly influenced our intentions in the following pages. We have hoped, by combining perspicuity with a full and detailed consideration of our

art, to furnish some safeguard to the public against the class of persons before hinted at : and for this purpose we have pointed out some of the indefensible practices of which they are guilty ; such as the substitution for gold of other metals electro-gilt ; the employment of impure gold, &c., &c., &c.

It is our belief that all the professions exist primarily for the public, and this is the only reply we can make to any who may think that we have too explicitly divulged the secrets of our noble art.

*133 Spruce Street, Philadelphia,
January, 1850.*

PART I.

THE SURGICAL, MECHANICAL, AND MEDICAL TREATMENT OF THE TEETH.

CHAPTER I.

THE HISTORY OF THE DENTAL ART.

THE origin of medicine, like that of many other arts, is involved in considerable obscurity. To heal the sick, mitigate the pangs of suffering humanity, and stand between disease and death, were considered god-like attributes; and therefore the ancients, who leant to the theological rather than to the natural truth of things, affirmed medicine to be a divine emanation, and impersonated it firstly in Apollo, and next in his son Æsculapius; and thus its early history is mixed up with mythology and poetry.

Although we cannot imagine a state of society so happy as to be free from pain,

disease, and death ; although accidents, the changes incident to the growth and decay of the human body, the invasions of pestilence and the casualties of battle, must at all times have called attention to medicine, and rendered the *practise* of the art a necessity, still we have no authentic history of its rise and early progress.

Eusebius mentions Athotes, an Egyptian monarch, as having written several treatises on anatomy ; but the existence of this king is doubted by others : and Thouth, an Egyptian, who according to Diodorus lived B. C. 2000, is generally supposed to be the first who wrote on medicine, which in his time was not cultivated as a separate art, but was practised indiscriminately by priests and warriors, poets and philosophers.

Although the increase of luxury, and consequently of attention to personal appearance, must have rendered the subject of dentistry one of considerable importance, and although the eye and ear had long been objects of particular observation and se-

parate practice ; yet it is not till the time of Hippocrates that we meet with any notice of the diseases of the teeth, or of those who practised the art of dental surgery. This is the more extraordinary, as the significance of these organs,—to say nothing of their ornamental or useful functions,—was acknowledged in a remarkable manner by the Egyptians, so that one of their most severe and infamous punishments consisted in the abstraction of a front tooth. There is no doubt, however, that the manufacture of artificial teeth, and other branches of dentistry, existed after a fashion, much earlier than history informs us. The loss of a front tooth, whether by disease or not, would naturally, under the circumstances of Egyptian law, give rise to unpleasant suspicions, and every exertion might be expected to be made to supply the deficiency. Accordingly, Belzoni and others have discovered artificial teeth in the sarcophagi of the Egyptians. These, it is true, are rudely made, and from being of wood, are ill adapted for per-

forming mastication : nevertheless it may fairly be inferred, that their effect on the articulation of the voice, and the support they afforded to their natural brethren, would suffice to point out dentistry as a pursuit for the ingenious and mechanical.

We have historical evidence, that in the palmy days of Greece and Rome, the diseases and general appearance of the teeth met with considerable attention.* Aristotle speaks of forceps for extracting the teeth. Pliny also and Martial mention various tooth-powders ; and the wearing of artificial teeth evoked the satire of more than one Roman poet.†

* At the commencement of the Christian era, we find, in the writings of Celsus, very explicit instructions respecting several important operations on the teeth : and during recent excavations at Pompeii and Herculaneum, various dental instruments have been discovered, much resembling some of those in use at the present day.

† Martial makes habitual allusions to artificial teeth as worn by the ladies of Rome in his time.

Among the Greeks, a peculiar affection called stupor of the teeth, is particularly described in connexion with the presence of tartar. This people looked upon dentition as a mysterious and significant event; and those who died before its fulfilment were denied the funeral honours of the adult, and ignominiously buried, instead of being burned in the usual manner.

As a *distinct* art, however, dentism received but little attention from the ancients. The writings of Hippocrates and Galen, which formed the medicodental text-books, contain receipts for electuaries, powders, and elixirs for beautifying the teeth, but nothing on what may be called the proper art and science of dentism.

In the early part of the eleventh century, Albucasis, an Arabian physician, wrote on diseases of the teeth, and gave drawings of a number of instruments used in his time for extracting, scraping, and the other dental operations then in practice. But it was not till the end of the sixteenth century that the

art began to receive that undivided attention to which it is entitled both by its difficulty and usefulness.

No less than thirty-eight treatises on the subject were published about that time.—These abound indeed with what is nowise useful at present, but still the spirit that produced them is an evidence that the subject was beginning to be considered of importance, and that time and experience alone were required to raise dental surgery to its proper station among the arts.

The first attempt to classify diseases of the teeth was made by M. Fouchard, of Paris, who has been denominated the father of dental surgery. Before his time, the practitioners of the art seem to have considered the teeth merely in their mechanical phase, taking little account of them as complex organic structures, entering by their own vitality into the formation of the living body. M. Fouchard had the merit of directing attention not only to the construction and separate treatment of teeth, but also to the

indications which, in common with the adjacent parts, they furnish of the general health.

This was an important advance in the subject. For that the teeth not only represent the apparent, but also the *innate* fundamental constitution of individuals, is unquestionably : nay, so intimately are beauty and firmness in these organs connected with health, that the celebrated Delabarre, (to whom we are indebted for an excellent work on the subject,) recommends those mothers who have constitutionally bad teeth, to refrain from suckling their children, lest they entail not only bad teeth, but debilitated constitutions, on their offspring ; and he points out that in choosing a wet-nurse, “her eyes should be lively and animated ; her hair and eyebrows brown or light-coloured ; her *teeth* sound and good ; her gums hard, and well coloured.”

We before mentioned that by the end of the sixteenth century, thirty-eight treatises had appeared on the teeth ; but so much had the subject grown in consideration at the end

of the eighteenth century, that no less than one hundred and fifty-eight works connected with it had then been printed.

Within the last century, dentistry has advanced far more rapidly in the United States than in any other country. Thus we have Gardette in 1821, Parmly, L. S. Parmly, and Flagg, in 1822, Trenor, 1828, Fitch, 1829, Brown, 1833, Spooner, 1836, Goddard, 1843; and in 1845, Dr. Harris, one of the editors of the *American Journal and Library of Dental Science*, published a most able and comprehensive work, entitled the *Principles and Practice of Dental Surgery*. And many other productions on the subject have appeared in America, and especially in the periodical just alluded to.

Before concluding we may be allowed a word respecting the present state of dental art and science. The conditions of success appear to be not different in this from what they are in other branches of knowledge and practice. They are all summed up in one phrase, UNITED LABOURS. Whatever of

discrepancy there is in the works of our chief authorities is greatly owing to the isolation in which they studied, and to the want of a general means of collating their ideas. Again, whatever of progress we find in that country which takes the lead in the dental art, appears to be due to an absence of prejudice and jealousy, which allows free communication of ideas, and association of common interests, among the members of the profession. For the association of dentists in America has not only given its members generally a *status* in society unknown to dentists elsewhere,—has not only repressed those characters who intrude themselves upon the public, and given merit its station and honesty its preeminence,—but has also contributed largely to the advanced state in which dental science stands in the United States.

Many names shine high over our heads in these respects, and present us with bright examples of scientific excellence, and practical success.

CHAPTER II.

THE FIRST SET OF TEETH.

EVERY parent should have at least a general knowledge of the development and anatomy of the first teeth, not only from its scientific interest, but also from its great importance in the management of children. The time for their first appearance, as well as for many of the other processes of nature, is subject to considerable variation. And although some authors have endeavoured to shew that the teeth furnish a test of age, yet there are many cases on record of children having been born with one, two, or more of these organs. Whatever history may sanction, Shakspeare committed no physiological error in attributing such a peculiarity to his hero, Richard, who is made to say, "I was born with teeth." The same is stated of Louis XIV., of France, in whom

the presence of a tooth at his birth seemed to forebode his future greatness. In our own day, Dr. Crump described before the American society of dental-surgeons, the case of a child whose jaws at birth exhibited the full deciduous denture.

The deciduous or milk teeth, originally produced by a process of secretion, are contained within their alveoli or sockets at birth: the forms of ten of them of a bony substance being distinctly visible in either jaw. As ossification proceeds, they assume a more perfect character. Their investing membrane secretes a fluid, from which a white substance is deposited upon the pulp; this is the enamel, which is at first of a consistence scarcely harder than chalk, but acquires such a degree of hardness by age, that a file is soon worn smooth in cutting it.

After birth, the growth of the teeth is rapid, and they cannot long be confined within their alveolar cavities or cells. Still however, as before observed, the time of their outward appearance is uncertain, de-

pending on the health and constitution of the child, and on a variety of other circumstances. During their growth, the fangs are the only parts that lengthen; and as this takes place, the sockets grow around and more closely invest them.

The twenty deciduous teeth—ten in the upper and ten in the lower jaw—generally make their appearance in the following order:—

The two lower, followed by the two upper, centrals, from the 4th to the 8th month.

The two lateral incisors in each jaw, from the 7th to the 11th month.

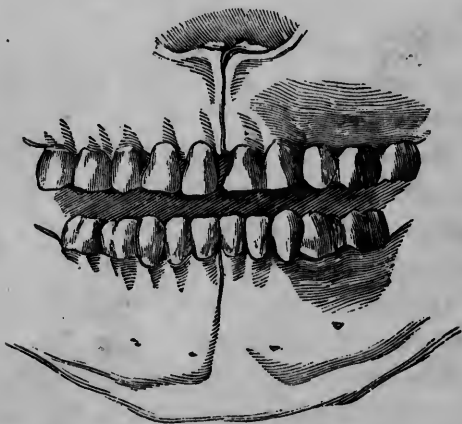
The four anterior molars, two in each jaw, from the 12th to the 18th month.

The four canines, two in each jaw, from the 16th to the 22nd month.

The four posterior molars, two in each jaw, from the 19th to the 38th month.

These furnish the complement of the deciduous or milk teeth, which are twenty in number, or ten in each jaw.

But these dates are only approximate. We have seen children that have attained the age of twelve months, or even sixteen, without cutting a tooth; and Lefoulon mentions a young girl of seven years of age, whose lower central teeth had not appeared; while on the other hand, as we before observed, there are many instances on record, where children have been born with teeth.



INFANTILE DISEASES FROM TEETHING.

The period of teething is one of pain and danger to the child, and of care and anxiety to the mother; for though in favourable cases, the symptoms are slightly marked, and limited to swelling and redness of the gums, increased flow of saliva, and slight affection of the bowels, yet it frequently happens that dentition is accompanied by signs of great constitutional derangement.

Teething usually commences about the third or fourth month, and is marked by increased flow of saliva, the infant having a tendency to put every thing within its reach into its mouth. After this state has continued a longer or shorter period, varying from six to twelve weeks, the symptoms become more severe; the gums swell, are inflamed and painful, so that the child does not willingly allow them to be touched; nay, sometimes refuses the breast.

In bad cases, symptoms of constitutional irritation now commence; the breathing be-

comes hurried and oppressed; the pulse quick and irregular, and the urine scanty and high coloured; delirium may come on, and in many cases violent, and even fatal convulsions may take place.

How are all these effects produced? The progress of the tooth is accompanied, or rather preceded, by the absorption of its investing membrane and of the gum; and if the tooth be inclined to advance more rapidly than this absorption takes place, a degree of pressure is exerted against the membrane and the gum. This reacts upon the pulp or vascular portion of the tooth, and a degree of constitutional irritation is set up, more or less violent, according to the pressure exerted and the resistance offered to it: under which circumstances the constitution of the child may reproduce the latent seeds of consumption or scrofula, or of other diseases which may have laid dormant for generations; and thus either the little sufferer may be worn out by constant pain and irritation, or his

future health, strength, and perchance his intellects, may be irrevocably impaired.

In one child we meet with hurried and oppressed respiration, giving evidence of congestion of the lungs: in another, the head is affected, and delirium, convulsions, or perhaps hydrocephalus, is the result.

Some infants have glandular swellings in the throat, with their concomitant evils; others are worn out by the slow fire of irritative fever.

This catalogue of infantine pains and miseries, fearful though it be, we are bound in honesty to set down, not, however, to alarm parents, but to shew that the process of teething is a most important one, and demands the greatest care and attention.

Nature frequently throws off the excess of irritation by means of her own, and thus it is that eruptions on the skin, breaking out behind the ears, and diarrhœa, are constant accompaniments of dentition.

While, however, we would urge upon mothers the duty of watching their tender

infants through the whole of this period, we would strongly condemn undue interference with nature, and above all, the common recourse to *opiates*, in the form of Godfrey's Cordial, Johnson's Soothing Syrup, &c., &c., by which many more children are sacrificed, than by the danger of teething itself.

The pain, swelling and redness of the gums, the eruptions on the skin, and the diarrhœa, may be considered as natural symptoms of the process, or as efforts of nature to avert its dangers, and therefore they generally subside upon the appearance of the tooth. Unless then the diarrhœa be excessive, and the child appears sinking under its effects, it does not require any treatment; or a least is easily manageable by the simple operation of lancing the gum, and by giving small alterative doses of chalk and mercury, or some similar preparation.—A teaspoonful of castor oil will commonly be a far more efficient *opiate* than all the Godfrey's Cordials and Soothing Syrups that were ever invented.

When the symptoms are severe, or the dentition protracted, medical aid should at once be called in, lest what is in itself a natural, and under proper management a safe, process, should lay the foundation of disease, pain and misery in the future.

PROGRESS OF THE SECOND OR PERMANENT TEETH IN THE JAWS, AT THE COMPLETION OF THE FIRST.

When all the deciduous or milk teeth are complete, and arranged in their respective places, and even before this, during the period of their growth, the second set is already in the course of preparation. In the whole of them ossification has already considerably proceeded; the four top and bottom front teeth are in an advanced state of formation; the four anterior molars are nearly perfect, and the remainder are in different stages of

development: while the rudiments of the wisdom teeth remain embedded in the alveoli.

At the age of six years there are generally no less than forty-eight teeth in the two jaws: twenty deciduous teeth, all perfect; and twenty-eight permanent teeth in various stages of evolution, and in separate and distinct cells, as represented in the following cut. On reference to this it will be observed, that the whole of the second set lies somewhat behind the first, and is confined in a narrower circle; so that as the second set increase in size, they must necessarily crowd the jaw, and ultimately force the first set out of their places. Although the second teeth are in distinct cells, their connection with the first set is continued by means of a cord (see plate), through a small opening at the bottom of the sockets of the deciduous teeth. This communication serves to supply the former with vitality; viz., blood-vessels, arteries, and nerves; and hence the necessity



of preserving the first teeth as long as possible,—a subject to which I shall more particularly allude when speaking of the causes of irregularity.

SHEDDING THE FIRST TEETH.

I shall not enter upon the various and conflicting opinions that have been broached on this subject, and which can only tend to confuse a matter really simple; but at once state the opinion of Mr. Bell, which seems to be the most rational one. He asserts, that as soon as the second teeth have advanced to a certain point of formation, and can no longer be contained within their own alveoli, absorption takes place in the anterior parietes of these cavities, by which means the teeth are allowed to come in some measure forward. In consequence of this absorption, it often happens that not only the socket of the corresponding temporary tooth, but that of the tooth on each side also, is open to the permanent one.

Absorption now commences at the root of the temporary tooth, generally on that part nearest its successor; and this goes on by degrees as the latter advances, until the root is completely removed. The crown at

length falls off, leaving room for the permanent tooth to supply its place.

The absorption of the root seldom, if ever, commences at its extremity, but generally at a considerable distance from it, and often near the neck. When a portion of the root has been removed, it has somewhat the appearance of being broken; but a little observation will soon enable any one instantly to detect the difference.

No precise time can be fixed when this important change will take place, or when the deciduous teeth will be removed, and a more numerous and powerful set supply their places. Indeed, so little is this event subject to an invariable rule, that we have met with patients of *thirty* and even *forty* years of age, with one or more of the temporary teeth still remaining.

The period varies considerably; on the one hand we have the cases mentioned above, while on the other, a child of nineteen months and a half old has been known to have *twelve* of the second teeth, their growth

entirely complete. In one instance, mentioned in the *Boston Medical Journal*, it is stated that a lady, forty years of age, had two central and two lateral incisors inserted: three months afterwards she had these artificial teeth removed, and in four months more had four natural ones in their places.

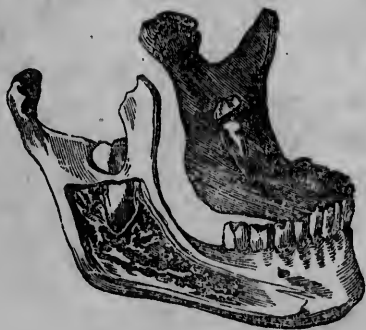
In the majority of instances, however, the appearance of the the second teeth takes place at from *six* to *eight* years of age, commencing with the first anterior permanent grinders, the cutting of which usually precede the shedding of the two central incisors of the lower jaw.

The following table will show, as accurately as the subject admits, the order in which the permanent teeth appear :

	Years of age.
4 Anterior Molares	from 6 to 7
4 Four Central Incisores, two in each jaw	" 7 to 7½
4 Lateral Incisores, on each side of the preceding	" 7 to 8
4 Anterior Bicuspides	" 8 to 9
4 Posterior Bicuspides	" 10 to 12
4 Cuspidati	" 11 to 13
4 Second Molares	" 12 to 14
4 Third Molares (or Wisdom Teeth)	" 18 to 30

These latter teeth, however, do not always appear in the order above indicated, and moreover occasionally they come forth in the most singular positions.

In the following cut it will be observed, that instead of the wisdom teeth being near the second molars at the back of the jaw (indicated by the white line), they have made their appearance considerably above, and out of, the natural situation.



The annexed wood-cut represents a front view of a complete set of adult permanent teeth.



CHAPTER III.

A COMPARATIVE VIEW OF THE TEETH OF MAN AND ANIMALS.

AMONGST the numerous marks by which the human race is distinguished from the brute creation, the perpendicular arrangement of the front teeth of the lower jaw is one of the most decided; for, however the human teeth may resemble those of animals in size and position, the developement of the chin shows that the erect posture is natural to man alone. In man again the teeth are of a uniform length and continuity of series; which is not the case as regards other animals, in which the *canine* teeth are observed to be of greater or less extent than the others, according to the wants of the animal. In the human being the hand supersedes the use of the teeth, whether considered as a weapon of offence or defence, or as an instrument for procuring food.

The following figure represents a human skull in which the denture is perfect.



If this be compared with that of a monkey, (which exhibits the nearest approach to the human form,) it will be found that while in both cases the teeth are equal in number, in the monkey the lower teeth diverge upwards and outwards, instead of upwards perpendicularly; and that the canines are considerably longer than the others, and than those of the corresponding class in man.



In the squirrel again we have a further confirmation of the fact, that the teeth of all animals are developed according to their wants and habits.



In this sketch it will be observed that there are only two front teeth, accompanied by a certain protuberance in either jaw; the bicuspides being deficient and the molares,

which fill the back part of the jaw, being separated from them by a considerable interval.

Again, on comparing the skull and denture of the lion with that of man, it will be found that the canine and incisor teeth are strikingly different, particularly the former; which, being intended in the lion to rend and tear the prey, for the previous mastication of which the animal has no mechanical contrivances, are developed very strongly indeed.



In the sheep, on the contrary, as the representative of another class of animals, it is remarkable that the front teeth in the upper jaw are altogether wanting.



In short, we may take the whole animal creation, and we shall find the same appropriate arrangement; proving incontestably that the teeth of all animals are peculiarly adapted to their several wants, habits, and necessities.

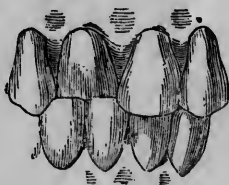
CHAPTER IV.

THE CAUSES OF IRREGULARITY OF THE TEETH.

IRREGULARITIES of arrangement can only be said to affect the second set of teeth, and are of two kinds, *temporary* and permanent.—The first kind arises from a too rapid advancement of the second teeth before a corresponding absorption of the first has taken place; by which the second are forced into unnatural positions, and pierce the gum either before, behind, or in some cases on the sides of, the temporary ones. The second kind of irregularity arises from the increased size of the second teeth as compared with the first, and from their coming forth before a sufficient expansion has taken place in the jaws to permit of the teeth piercing the gum in a regular manner.

These irregularities are chiefly confined to the front of the mouth, though cases do

occur, and that, frequently, in which the bicuspidæ are affected in the above manner. Moreover many cases which at first come under the denomination of temporary, may, if allowed to continue beyond a certain time, become permanent: for example, when a second tooth pierces the gum either too anteriorly or too posteriorly, the consequence of which is the irregularity here represented.



This would become a permanent deformity, unless recourse were had to some mechanical means which will be explained when we come to speak of the treatment of these cases.

What are termed permanent deformities of the second denture arise from several causes; as from a natural want of room in the jaws themselves to admit of the in-

creased size of the second teeth; from malformation of the teeth and jaws;* or from a deep declivity in the arch of the upper jaw and a contraction of its angles.

The most serious cause of irregularity of the second teeth remains yet to be spoken of; viz., the too early extraction of the *first* teeth before the second are sufficiently developed to take their places; which is frequently practised under the idea of preventing deformity. That this practice, however, is more often the cause of permanent deformities of the second denture than any other, may be easily proved. For how often do we meet with otherwise beautiful faces, the contour of which has been irremediably destroyed by it! The practice itself cannot be to severely reprobated; nor can those

* Some curious anomalies of the teeth are related by Pliny and Dr. Pritchard; the former mentions the case of Pyrrhus, King of Epirus, in whom all the crowns were united; the latter states, that in a recent excavation, he discovered an ancient Roman skull, in which the teeth presented similar appearances.

who indulge in it be allowed to remain within the pale of civilized dentism.

What can be more painful than to see a naturally well-formed mouth permanently disfigured by the practitioner to whose care it has been entrusted, and who, with the professed design of preventing, actually entails an irremoveable deformity on his patient?

Many cases might be related in which the face has been permanently disfigured in this manner.

THE MECHANICAL TREATMENT OF IRREGULARITIES OF THE SECOND TEETH.

There is no branch of the dental art on which there exists a greater diversity of opinion, than the treatment of irregularities of the second dentition. Not only are mechanical contrivances constantly made use of, which are erroneous in principle, and

consequently do harm instead of good ; but the time at which really useful means may be employed with advantage is by no means settled among dental practitioners. The subject is one of the greatest importance, not only as regards comfort and personal appearance, but the possession of a free and perfect enunciation. We shall therefore devote a chapter to this illustration.

Numerous works have been written on the proper treatment of irregularities of the teeth ; and each author, though differing from his brethren perhaps in every thing else, lays down the principle that no alteration in the position of the teeth can be effected after the age of fourteen.

Mr. Bell, indeed, mentions a patient, whom he successfully treated in a case of the kind between the ages of 19 and 20 ; but the prevailing opinion is, that it is useless to interfere with irregularities of the teeth after fifteen or sixteen years of age.

We have, however, for some years been impressed with the opinion, that irregulari-

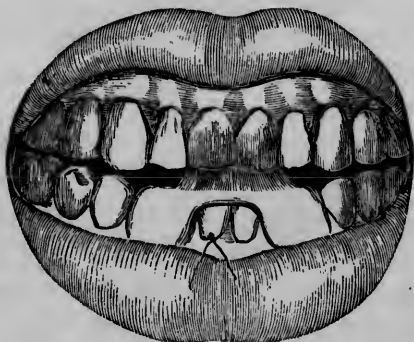
ties of the human teeth are susceptible of great improvement, if not of complete cure, at a much later period than the generality of the profession seemed willing to allow; in this opinion we have since been confirmed by the successful results of practice.

Cases frequently occur in which the *two upper centrals* are developed so far back in the dental arch, that the under teeth come in front of them every time the jaws are closed.

In its earlier stages this malposition may be easily corrected, but when it is left until the growth of the teeth is complete, it can never be remedied without the aid of mechanical means to bring the misplaced teeth into their proper and regular position.

To effect this, a plate of gold is accurately fitted to the lower teeth, on their external and internal surfaces and edges. To the upper margin of this, another portion of the same material is soldered, constituting an inclined plane, prolonged so far into the mouth, that when the lower jaw is thrown forward, it shall still extend behind the deformed

teeth; as here represented in the following engraving.



It is clear, then, that by this mechanical arrangement, when strictly adhered to, every closure of the mouth must exert a constant and steady pressure upon the irregular teeth, until the deformity is counteracted by bringing them over the lower jaw. In those cases where the *four front teeth* in the upper jaw close behind those of the lower, the apparatus should be so construct-

ed as to extend to the first molar tooth on each side, over the grinding surfaces of which it should be carried in the form of cups, which will not only prevent the usual approximation of the two jaws, but act as a security against the displacement of the apparatus in closing the mouth. To the plate opposite each irregular tooth is soldered the piece of gold constituting the inclined plane, as given in the above diagram.

It is impossible to give all the varieties of malposition that occur in practice, or to describe the mechanical means by which reduction is to be effected in every case. We have therefore mentioned those cases that are most frequent; leaving it to the ingenuity and inventive genius of the practical dentist to vary his arrangements according to the circumstances of each individual case: and we shall only remark in conclusion, that we have seldom seen a case that was entirely unmanageable by mechanical means, provided *time* could be allowed for the treatment. It must however be remembered,

that the length of the time will depend, not only upon the extent of the deformity and the difficulty of the case, but also upon the period that has been suffered to elapse before the treatment was commenced.

CHAPTER V.

PREVENTION OF IRREGULARITIES OF THE TEETH.

2

THE preservation of the first teeth is so essential to the proper developement and arrangement of the second, that in no instance ought the former to be removed without the advice of a dentist, under whose care the child should be placed at six years of age. The following rules will be of use in examining the mouth with a view to prevent irregularities.

The arch of the jaw should be well developed; its angles should present a semi-circular form; the front temporary teeth, which *originally* were crowded, being somewhat separated from each other, so as to indicate a gradual expansion of the jaw; the first permanent molar teeth should be well formed, of moderate size, without any

prominence of the gum behind the temporary teeth to show the advance of the permanent. If the teeth of a child resemble those of one of his parents, the arch of whose jaw is broad and well defined, and whose teeth are of a regular character, the circumstance may be considered auspicious of the development of a regular set of permanent teeth, and the practitioner may give a favourable prognosis accordingly. At the same time he should point out the danger of a premature removal of the deciduous teeth, before the second are sufficiently advanced to take their places; and should urge the necessity of the greatest cleanliness.

There are some cases, however, in which the assistance of a dentist is peremptorily demanded, and where the future appearance of the patient will depend on his skill and judgment.

It occasionally happens that the permanent central teeth of the lower jaw pierce the gum behind the temporary ones, and before

corresponding absorption of these has taken place.

In these cases it will be necessary to remove the deciduous teeth in front ; or should there not *then* be room, one or both of the lateral teeth : but this operation should, if possible, be delayed till it is seen whether the gradual and natural expansion of the jaw may not remedy the defect ; for the *premature* removal of the laterals takes away the natural support of the permanent centrals, and an unsightly separation is frequently caused, which it requires considerable ingenuity to rectify.

The two front teeth in each jaw occasionally overlap each other, either from a too crowded state of the teeth themselves, or from a want of expansion of the jaws : in this case the removal of the two lateral incisors on each side is necessary to give space for the permanent front teeth to come forward.

Occasionally the lateral teeth themselves, or those on each side the two front teeth,

lap over the latter: in such cases the *deciduous* canine teeth should be extracted.— But if it appears probable that the jaw will expand, which can only be ascertained by an examination of its arch, then these teeth should not be removed till a later period, as they tend to preserve the shape of the arch itself.

Irregularities are, however, more frequently met with in the cuspидates, which are the last teeth to make their appearance in the front of the jaw; and to these irregularities I would particularly direct attention, as on the preservation and proper development of the cuspидates the beauty and contour of the face materially depend. The cuspидates, canine or eye-teeth are the key-stones of the dental arch; remove them, and you have an imperfect, unsafe and distorted structure.

The cuspидates, as we before observed, are the last to make their appearance in the *front* of the mouth, and when the others are formed and arranged, lie imbedded high up in the jaw, where they can easily be felt

by means of a protuberance on the sides of the gum.

It sometimes happens that the bicuspidates are produced at the sides of the laterals, leaving no room for the canines or eye-teeth. In these cases we must not wait till the cuspidates are fully developed, and project over the others, but at once remove the first bicuspid on either side. The canines themselves should hardly ever be removed; though in some few cases it may be absolutely necessary to extract the two lateral incisors, but not without being satisfied that the adjustment of the canines would be otherwise impossible. There is, however, one exception to this rule in reference to the removal of the canines; and that is, when the teeth have been allowed to remain till they are fixed in malposition, and project at right angles with the nose. But these cases are rare. Nothing, in fine, can justify the practice of removing the eye-teeth, and thus destroying the beauty and contour of the face, but the most imperative necessity.

The next kind of irregularity is in the bicuspidés, at the sides of the mouth ; this is produced by want of room, the bicuspidés being found to project either inwards or outwards from their natural position. To remedy these cases, it is necessary to remove the deciduous molares ; and then, should not sufficient room be given, the first permanent molar teeth also, *if* they be decayed ; if not, the second bicuspidés : by either of which plans sufficient space will be made for the first bicuspid teeth to take up their proper stations.

It must be kept in mind, however, that it is better to sacrifice the second bicuspid than a *sound* permanent tooth.

The following cut exhibits the bicuspid teeth at the time, and in the position, of which we are speaking.

There are occasionally other malpositions of the teeth, but they occur so seldom, that it is unnecessary to describe them ; they all require the skill of the dentist to remedy them, and in the treatment of all he must



bear in mind, that the lesser evils are to be preferred to greater, that nature can only be conquered by submission, and that the laws of the animal economy are to be consulted and obeyed, but not subverted.

CHAPTER VI.

THE CAUSE OF CARIES.

THIS affection of the teeth, which causes their premature destruction, and is attended at times with considerable pain, is not confined to any age or to either sex. It generally indeed attacks the young, and is rarely met with past the age of sixty, but this is by no means an invariable rule.

The opinions on the cause of this disease are almost as numerous as the authors who have treated on it; though rich as we consequently are in such opinions, the real question is as much a matter of doubt as when Hunter first promulgated his sentiments on the subject. For the reader's edification, or amusement, we shall prove these assertions out of the mouths of the most eminent of those who have favoured the world with their views.

“Who shall decide when doctors disagree?”

Hunter (1778) says: “This decay does not seem to be so entirely the effect of *accident* as might be imagined: it sometimes takes place in the teeth in pairs, in which case we may suppose it owing to an original cause, coming into action at its stated time, —the corresponding teeth being in pairs with respect to the disease, as well as to situation, shape, &c.”

He further says: “This disease has not hitherto been accounted for: if it had been always on the inside of the cavity, it might have been supposed to be owing to a deficiency of nourishment, from some fault in the vascular system; but as it begins most commonly externally, in a part where the teeth, in their most sound state, receive little or no nourishment, we cannot refer it to that cause; we may therefore reasonably suppose that it is a disease arising originally in the tooth itself.”

Ruspini (1784) says: “Various are the species of *caries*; almost every part of the

teeth is affected by it, and both internal and external causes produce it. A *caries* may be divided into soft, superficial, deep, and dry: it attacks the *root*, the *neck*, or the *crown* of the teeth. The *caries* that proceeds from internal causes, namely, the scurvy, &c., *generally* affects the root of the tooth, often the internal surface, sometimes the external, and even the inward cavity of the body [of the tooth].”

Gerbeaux, of Paris (1802), says “that diseases of the teeth among many individuals originate in organic disposition, which may be transmitted from fathers to their children.”

According to *Fox* (1813), “The proximate cause of caries appears to be, an inflammation in the bone of the *crown* of the tooth, which, on account of its peculiar structure, terminates in mortification. The chief predisposition to this disease consists in a defective formation, of either the enamel or bony part of the teeth. . . .

“It is not in our power to alter the laws

of nature, or change the natural constitution of man; we can only obviate evils, by attending to the causes which produce them; and it is in this manner we can, in a very great measure, preserve the teeth from disease."

Hertz (1815) observes: "Heat, to a certain degree, is highly detrimental to the vitality of the teeth; hence we find that those animals, who live chiefly on hot food, are most subject to carious teeth. Increased circulation in the gums, whether the effect of mercury, or general fever of the system, is also very injurious to the teeth, and hence caries of the teeth is a common consequence of salivation and inflammatory fever."

Bew (1819): "To those who only casually glance at the teeth primary or permanent, with healthy gums, fitly arranged in their several sockets for the purposes of mastication, aided by the conviction of sight and feeling, that they are the hardest substance in our system, how inexplicable and irreconcilable to credibility must it appear, that

these *very hard* substances, with their *flinty coatings*, date their destruction from completion, by *lateral pressure against each other !*”

Parmly (1820): “The premature decay of the teeth is the consequence of uncleanness, which acts upon them in the same manner as on other parts, by sapping and corroding the vital energy, and thereby causing them to mould away.”

Clarke (1829) says, that “caries or rottenness of the teeth, in every instance, commences externally, and that external remedies will arrest, if not prevent, it altogether. . . . When indentation or such like inequality occurs on the surfaces of the teeth, the juices of the mouth then become stagnant ; their properties change, and they exert a pernicious influence, aided by the putrefying particles of animal and vegetable substances which likewise necessarily lodge there.”

Bell, in 1835, states, that the true proximate cause of dental gangrene [caries] is

inflammation, which appears, according to him, to take place in the following manner : “ When from cold, or from any other cause, a tooth becomes inflamed, the part which suffers the most severely is unable, from its possessing comparatively but a small degree of vital power, to recover from the effects of inflammation, and mortification of that part is the consequence. The situation in which gangrene invariably makes its first appearance, immediately under the enamel, upon the surface of the bone, is, I think, explicable only with the view I have taken of the structure of the teeth and the nature of this disease. As the vessels and nerves which supply the bone of the teeth are principally derived from the internal membrane, it is natural to conclude, that, in so dense a structure, the organization would be less perfect in those parts which are farthest removed from its source.”

Saunders (1837) says: “That very general and distressing disease of the teeth which is familiarly known by the term caries

or decay, may be referred to two distinct sets of causes, one of which may be termed constitutional or predisposing, and the other, developing or exciting causes. Under the former are included all the hereditary predispositions to disease which may sometimes be observed in a certain tooth, or class of teeth, in certain members of a family. These organs are predisposed to disease, from interruptions and commotions in the system occurring during their formation.—Of this class are all those ailments and affections which make up the catalogue of infantile diseases, and which, by producing an irregular or vitiated condition of the secretions, interfere more or less with the proper action of the parts concerned in the production or formation of the teeth. The exciting or developing causes of disease consist in subjecting the teeth to violent and unnatural action and uses, such as cracking nuts, biting hard substances, &c.”

Robertson (1840): “Upon examination it will be found that there are fissures formed

in the enamel of the teeth, in consequence of the irregular distribution of that substance upon their surfaces; and that there are also interstices produced by the crowded position of the teeth, and the irregularity of their shape. In these situations particles of food are retained, which undergo a process of decomposition, and acquire the property of corroding, disuniting, and thereby destroying, the earthy and animal substance of which the teeth are composed. This is the cause of the destruction of the teeth, commonly called ‘caries,’ and it is not the result of inflammation either in the membrane or the bone of the tooth,” &c.

White (1844): “The principal and direct cause of caries is the corrosive action of external agents: among these, undoubtedly, the acid formed in the mouth by the decomposition of vegetable matter is one of the principal. In the depressions upon the grinding surfaces of the molar teeth the food finds a lodgment, and continues from day to day until the acid has formed and acted

upon the enamel, which is frequently imperfect in those parts."

Harris (1845): "If the decay of the teeth is not referable to inflammation in their bony structure, to what is it to be ascribed? The inference is, that it is the result of the action of chemical agents, and when we take into consideration that the fluids of the mouth, when in a morbid condition, are capable of decomposing their enamels, if not possessed of more than ordinary density, and that the disease frequently commences upon this outer covering, the conclusion is at once irresistible. . . . As I have before remarked, caries is always upon the external surfaces, sometimes upon the enamel, but most frequently upon the bone within the indentations on the grinding faces of the bicuspidæ and molares; and on the approximal sides of the teeth, where this outer covering is frequently so fractured by the pressure that is exerted upon it, that the juices of the mouth find ready access to the subjacent osseous tissue. The destruction

of the organs may be gradually going on here for months, and even years, without any notable signs of its existence : and the commencement of the disease in these places had led many to suppose that it had its origin within their osseous structure. . . .

Among the indirect causes, therefore, of caries, the the following may be enumerated: —putrescent particles of vegetable or animal matter between the teeth ; depositions of tartar ; a febrile or irritable state of the body ; a mercurial diathesis of the general system ; artificial teeth, improperly inserted, or of bad materials ; roots of teeth ; irregularity in the arrangement of the teeth ; too great pressure of the teeth against each other ; and, in short, every thing that is productive of irritation to the alveolar and dental membranes or gums.”

The above extracts may be considered sufficient to show how little is really known of the causes of caries. And now, having cited the opinions of others, I shall perhaps be expected to register my own. The field

of speculation, however, is well enough occupied without it: and moreover any view would be practically worthless, unless it enabled us to foresee the disorganization of the teeth, which we cannot do at present. I will nevertheless commit myself so far as to observe, that the nearest approach to truth appears to me to be the chemical theory of Parmly, put forth in the year 1820, and maintained by Dr. C. A. Harris in his last work. But even this theory requires completion. The labours of recent pathologists seem to show, that an acid liquor is secreted by the glands of the gums contiguous to the necks of the teeth, and that it is to the agency of this liquor that caries is contingently due; an opinion the more plausible from the circumstance, that the lower incisor teeth, which are continually washed in the *alkaline* secretions of the mouth, are far less subject to caries than the upper.

This acid secretion acquires increased strength and activity in those disorders that debilitate the stomach; and hence, perhaps,

it is that the teeth are frequently affected with caries in such cases, particularly where the disease is of long standing, and has seriously impaired the digestive functions.—The fact that carious teeth are attendants on a weak stomach or vitiated digestion, and are seldom met with where the stomach is strong and healthy, is well established, and may tend to confirm the chemical theory.

Nevertheless, in all chemical reasonings on the living body, it is well to bear in mind, that where the system, or any part of it, is vigorous, its vitality enables it to resist chemical agencies ; and that the measure in which the latter govern it, determines the departure from health and soundness. The greatest instance of this is seen in the difference between the living and the dead body. The former is bathed in gaseous compounds, which have a powerful tendency to act upon it ; but its life restrains them, and their chemical affinities are controlled. In the dead body, on the other hand, the surrounding atmosphere, moisture, &c., at once exert

their peculiar forces, and decomposition is the result. And therefore it appears to us, that chemical operations of the saliva upon the teeth *presuppose* diminished vitality in those organs, otherwise such operations would be held in check. And for this reason it is that we regard even the chemical theory as less than half the truth on the subject of caries.

THE CAUSES AND TREATMENT OF TOOTH-ACHE.

Tooth-ache is a term applied indiscriminately in common discourse to all pains affecting the teeth and jaws. It may arise, however, from very different causes ; as from exposure of the dental nerve, from fungus of the pulp, from the confinement of pus in the internal cavity of a tooth, from disease of the membrane covering the fang (periosteum), from sympathy, &c., &c., &c.

When a tooth is sound, its nerve is confined in a thick bony covering, which effectually shields it from injury, but often the nerve is exposed by disease to the action of air, fluids, food, or irritants of any kind, and in this event the most intense pain may result, proportioned to the degree of nervous lesion. When tooth-ache originates in inflammation of the internal pulp from any of the above causes, the pain is sharp, lancinating and throbbing, and is not increased by pressure upon the part affected.

Sometimes inflammation takes place in the cavity of the tooth, and the nerve suppurates. Pain may be felt for months before suppuration occurs, though the latter more generally commences on the first or second paroxysm. But invariably sooner or later the *crown* of the tooth decays, and the nerve is completely exposed.

Next after tooth-ache arising from exposure of the nerve, that which depends upon the confinement of pus in the dental cavity is the most frequent. In the commencement

of these cases the pain is felt only when hot or cold liquid passes over the affected tooth, but gradually a steady gnawing pain supervenes, the tooth becomes sore and tender, seems a little loose and longer than the others, and pain darts from it along the nerves to the temple, the ear, the side of the head, and the neighbouring teeth in both jaws. When a tooth first grows painful in this way, it is about to suppurate; when it appears longer than the rest, loose, and exceedingly sore, the nerve has suppurated, and the pus is already oozing from the end of the fang where the vessel and nerves enter. When the cheek begins to swell, it is a sign that the matter is spreading between the alveolus and its lining membrane; which occasions the throbbing pain felt during the formation of alveolar abscess.

It is by the same process, when the fang of a diseased tooth is near the antrum, that true abscess of that cavity takes place.

Pain, however, may exist, the nerve may suppurate, and the face swell, and both the

pain and swelling again subside, without the formation of abscess; in which case the matter insinuates itself between the end of the fang and its membranous covering, there forming a sac about the size of a pea or a little larger. In the course of time this sac will burst, and discharge its pus between the fang and the alveolar process.

In tooth-ache arising from inflammation and thickening of the membranous covering of the end of the fang, and resulting in the formation of pus, the pain is confined to the tooth, the nerve of which has suppurated, and produced alveolar abscess. In these cases, the suppuration of the nerve and the formation of an abscess are always primary causes of the disease. The pain is generally dull and heavy; the tooth becomes a little sore, and loose; immediately over and all along the fang the gums are much inflamed, and of a *bluish* tinge. When the pain becomes throbbing, matter is in course of formation, and partial filling up of the alveolar process takes place, forming what is termed

a gum-boil. In some cases of the kind, if allowed to proceed unchecked, part of the alveolar process is absorbed, and a fistulous opening forms on the outside of the cheek.

Fungus of the pulp is a small tumor of a deep red colour, either in the canal of the fang,—in which case it is so minute as to be often mistaken for the nerve itself;—or else in the cavity of the crown, which it generally fills when it is present there. It is very soft, bleeds freely on the slightest touch, and varies in size from a pin's head to a large pea. Sometimes it is quite insensitive; in other cases exquisitely sensitive; but the pain it occasions is not accompanied by the dartings and throbbings that characterize genuine affections of the nerve. No other disease of the mouth renders the breath so disagreeably offensive as the fungus of which we are now speaking.

All the above kinds of tooth ache, with the exception of the last (sympathetic tooth-ache), are of an inflammatory character, and require to be treated on the antiphlogistic

plan. Cold water is the best application to them; and this, if the *crown* of the tooth be affected, will generally afford immediate relief. On the other hand, if the inflammation be lower down, the cold water will at first increase the pain, but if persevered in, will eventually relieve it. Where the inflammatory action runs high, and the pain is very severe, it will be necessary to resort to more active treatment: leeches should be freely applied to the gums, a brisk purge administered, and lowering regimen be strictly enforced. Should it appear impossible to prevent suppuration, and should the patient object at the time to the removal of the tooth, warm fomentations containing a proportion of opium or henbane should be applied to the parts, and as soon as the matter has formed, the tooth should be *at once* extracted.

The cause of the *peculiar* pain of tooth-ache appears to consist in the circumstance, that the dental vessels and nerves are confined in bony canals, which during inflammation do not admit of vascular congestion

without producing severe compression of the nervous fibres. In this way we can account for the fact, that conditions which increase the vascular action of the system are very apt to be attended with tooth-ache. In pregnancy, it is well known that the blood, when drawn, exhibits the characteristic buffy coat of inflammation; in pregnancy, therefore, tooth-ache is a common affection. With respect to the cause of the pain, the teeth follow the same law as many other organs,—as the ear, the bones generally, &c.,—in which the distress is pretty nearly proportioned to the unyielding nature of the parts. In this way it happens, that structures which are least vital or sensitive in health become the seats of agonizing pain during inflammation, which tends to expand them violently, according to the laws of the pressure of fluids; a pressure which we all know to be so great.

The treatment of tooth-ache from exposure of the nerve must be simply *palliative*. The essential oils, mineral acids, creosote,

and a variety of stimulants, have been used, with more or less success, to benumb or destroy the sensibility of the part. It is not well, however, to apply them indiscriminately, for in some cases they do mischief. In our experience, the most useful applications have been our odontalgic drops, or a mixture of creosote and morphia made into a paste with finely-powdered gum-mastic, and applied to the nerve on a small piece of lint. Tincture of galls has also been employed in these tooth-aches, but it is less certain in its effects than the substances just mentioned, and therefore we are seldom called upon to use it.

We are not among those who advocate what is denominated the radical treatment, which consists in crushing or cauterizing the nerve, and which some writers inform us is a painless or even a pleasant operation. On this subject we shall say nothing.—Sooner or later nature performs a cure; the nerve being removed from exposure and contact by suppuration. Till this event takes

place, the palliative treatment involves all that can be done with prudence.

Fungus of the pulp is occasionally removed by lunar caustic, which, if repeatedly applied, will destroy the diseased part, while temporary relief may be gained by puncturing the fungus and causing it to bleed freely. But extraction is the only permanent cure; for so long as the tooth remains in the mouth, the disease generally returns, whatever may have been done, after the expiration of a few months.

When pus has collected in the inner cavity of a tooth, when the face is swollen, and there is throbbing pain, the tooth must be removed. At an early period, the tooth may be trepanned or drilled, and the matter thus discharged; a plan which may be successful in some cases even where pus has begun to ooze from the end of the fang.

Tooth-ache arising from disease of the periosteum or covering of the fang may generally be relieved by the application of leeches to the gum, and the administration

of sedatives internally; or by making an incision through the gum the entire length of the fang, and then applying a roasted fig or a bruised raisin.

It remains for us to notice tooth-ache arising *from sympathy*; an affection due to the intimate unity of the nervous system, all the parts of which are in mutual connexion with each other.

As one instance of the kind, during the formation of alveolar abscess, the surrounding parts are frequently affected with pain and inflammation; all the teeth suffering in turn, although but a single one is generally the prime seat of the disease,

Sympathetic tooth-ache is most frequent during pregnancy, and may arise from increased or diminished action of the general system. Sometimes it proceeds from a tooth already diseased, and, where this is the cause, it should, if possible, be at once removed. But care is requisite here to judge correctly, for pain from teeth thus affected may generally be removed by appropriate

means. Moreover, we have known hundreds of cases in which tooth after tooth was removed without affording relief; and it was only when the teeth of the patient and the reputation of the practitioner were sacrificed, that the real cause of the disease was rightly suspected to be, not in the mouth, but in the general state of the system.

CHAPTER VII.

STOPPING, PLUGGING, OR FILLING.

THIS operation, if timely resorted to, and well performed, is one of the most valuable in dental surgery.

To secure its advantages, it ought to be undertaken while the decay is in the incipient stage, before it has penetrated so far as to affect the nerve. For this reason it is, that those who wish to preserve their teeth, should periodically visit the dentist; for in some cases the progress of decay is very rapid, yet is only indicated by a small speck on the enamel, which latter the disease proceeds to undermine, till that substance, being robbed of its natural support, suddenly gives way, and a large cavity is exposed, although the tooth was not even suspected to be in a state of caries.

How often do we hear a patient remark,

that he has had a spot on some particular tooth *for years*; to which spot, as it is unaccompanied by pain, he attaches no importance, erroneously believing it to be a *mere* discolouration. Now the truth is, that the most favourable time for stopping is at the commencement of decay, when a spot *first* appears on the surface of the enamel, or a discolouration is observed between the teeth and the external surface. Although, however, this is the best time for operation, it may be performed with every probability of success at a later period, even when the tooth is so far decayed as to expose the nerve and give considerable pain. In these neglected cases, a judicious application of the palliative treatment before referred to must be made, and the irritability of the exposed nerve allayed, before stopping is attempted. This object may be gained, even though the patient have suffered many paroxysms of pain, and thus the tooth may be rendered capable of bearing without inconvenience any pressure necessary in the operation.

We can safely assert, that there are comparatively few cases (provided the surrounding parts are healthy) in which this operation may not be employed with advantage, and extraction thereby avoided, and the services of a valuable tooth secured for years.

Extraction is frequently resorted to, not from absolute necessity, but because it is readier and shorter than stopping; of course we cannot commend the practitioners who save themselves trouble by this alternative.

Neither is the practice to be commended of extracting teeth merely because they are decayed and painful, without reference to all the circumstances of the case. What should we think of a surgeon who amputated a diseased limb without first attempting to cure it, and thus save it for the patient's use? And what shall we think of a dentist who rushes at once in all cases to the extreme operation of extraction, and removes teeth that, by judicious treatment, might still be serviceable in mastication, and preserve intact the appearance of the mouth for years?

We shall now describe the operation of stopping.

Having ascertained that there is no pain in the tooth, and that it will bear the necessary force and pressure without giving pain, the cavity which we wish to stop is to be well cleaned out by appropriate cutting instruments, until every vestige of decay is removed, and until the cavity is of such a form that it will not only contain, but retain, the stopping material. On the proper performance of this part of the process much of the after success of the operation depends

According to the microscopic investigations of these eminent odontologists, Retzius, Frankel, Müller and Owen, a tooth is in reality a bundle of tubes parallel to each other, and which contain inorganic deposits of calcareous salts. Owen asserts that in excavating the decayed portion of a tooth, the above tubes are divided; and that after the stopping is introduced, they exude a thin firm layer of calcareous matter, which inter-

venes between the material employed for filling the cavity and the exposed extremities of the tubular orifices.

EXCAVATING CARIOUS PORTIONS.

During the process of excavation, the cavity should be frequently syringed with warm water, to remove any minute fragments of diseased bone; and before the stopping is introduced, the same cavity should be carefully rinsed out with a little eau-de-Cologne or other spirit, and then dried with a small piece of lint or cotton. If the least moisture be allowed to remain, it will not only prevent the close packing of the stopping material, but will frequently cause the latter to fall out.

The instruments used for stopping vary much in size and shape, according to the taste of the operator, who has them so constructed as to enable him to use them with

facility upon any part of the tooth. It is unnecessary for us to allude to them more particularly, than to say, that the dentist should be provided with a sufficient variety to suit any probable case.

The cavity having been well prepared, a quantity of gold-leaf is cut in strips varying from half an inch to an inch in width. One of these strips is now loosely folded, and the end of it introduced by a proper instrument to the bottom of the cavity. In the next place, the remainder of the gold, on the outside of the cavity, is folded on the first, and then carried to the side of the cavity, from whence the folding should be commenced; and so on always to the same side; taking care, as each fold is inserted, that it comes in close contact with the bottom, and with the metal first and subsequently introduced.—The last part of each fold should be left somewhat higher than the outer rim of the orifice or cavity. This kind of packing is to be continued until every part of the cavity is perfectly filled, when an instrument nearly

the size of the orifice should be employed to give the whole solidity, by pressing it firmly toward the bottom. After this, a small, round, sharp instrument should be applied to the edges of the stopping, to force it into close contact with the sides of the orifice. If more gold than necessary has been used, the overplus may be scraped or filed down level with the enamel of the tooth. In the last place, the surface is to be highly polished with a burnisher.

In the upper jaw, the lateral edges of the front teeth are frequently affected with caries. In the early stages of the disease it is necessary to stop them with *gold*, but without having recourse to the file for the purpose of enlarging the division between them, as is generally done, to enable the operator to use his instruments with facility. In young persons of from ten to eighteen years of age, the use of the file should, if possible, be avoided; for the friction caused by it cannot fail to occasion considerable derangement of structures so delicately organized as the

teeth, and even in some cases may result in their destruction.

Where it is necessary to stop the front teeth in young persons, it is best to separate them by means of a thin piece of Indian rubber, stretched to the utmost, in which state it is inserted between them, and allowed to collapse. By renewing this every second day for a week, it will be found that ample space is gained to enable the operator to stop the teeth without difficulty. After the operation is performed, the teeth will in a few hours return to the natural position, without having sustained the slightest injury.

Well-stopped teeth have been known to last, and be serviceable, for forty years and more, without pain or inconvenience.

It is a rule, that the operation must not be attempted so long as a vestige of pain continues. A course of palliative treatment must always be undergone previously, whenever internal inflammation is present.

MATERIALS USED FOR STOPPING.

Much has been written respecting the materials which are proper to be used for stopping the teeth, and these practitioners have been generally condemned who employ anything but gold for the purpose. The cements particularly are considered unsuitable materials. The American dentists, always in earnest, have gone so far as to exclude from their Society any one who employs cement stopping.

That pure gold-leaf is not only the *best*, but the *only* material that ought, as a rule, to be employed in this operation, we ourselves have no doubt. Its toughness and ductility, the readiness with which it can be packed in the tooth, and particularly that noble quality by which it resists oxidation and the chemical agency of the salts of the saliva,—all these circumstances mark it as especially fitted for stopping the teeth. It need scarcely be observed, that where leaf gold is used, the plate or leaf should bear

some proportion in substance to the size of the cavity to be filled ; that it should be comparatively thick, if the cavity be large, and thin in proportion as the latter is small in extent.

Notwithstanding the plain superiority of gold, several other materials are used for stopping, which, on account of their cheapness, and the facility with which they can be placed in the teeth, have (unfortunately for the public) many professed advocates. Most of these materials undergo chemical changes from the saliva, and are at once injurious to the teeth and to the general health.

Pure platina may be employed with *safety*. But the platina of commerce is often mixed with other metals ; and in any case it is so much less ductile or manageable than gold, that it can seldom or never be used with advantage.

Tin also undergoes but little change in the mouth, and may be used with comparative safety ; but lead (which is occasionally employed) is readily acted upon by the saliva,

and becomes highly poisonous. The same remark applied to silver leaf. The salts of the mouth act upon it, and convert it into protoxide of silver.

Of the many compounds advertised for stopping, all are alike injurious and objectionable. Their cheapness is their only recommendation, and this is often hypothetical, considering that the health may be seriously injured by employing them.

CHAPTER VIII.

ALVEOLAR ABSCESS AND GUM-BOIL.

OF all the disorders to which the teeth and gums are liable, none is more painful, or, if allowed to proceed, more injurious to the surrounding parts, than alveolar abscess. It usually begins at the end of the fang, but occasionally even on the inside of the palate. A variety of causes may produce it, but the most frequent of these is irritation and local inflammation arising from the fang or root of a carious tooth. Even sound teeth, however, are liable to be attacked by it, either in consequence of cold, or mechanical violence, which frequently produces inflammation and thickening of the membranous covering of the fang. Whatever cause it may arise from, the inflammatory action should be relieved as speedily as possible, otherwise it may increase, and extending to the neighbouring

parts, produce suppuration, and eventually absorption and exfoliation. In the latter case, the whole system is affected by the pain, and the matter issues, either externally, in a constant discharge of fetid pus.

The treatment should commence when tenderness is first felt in the tooth or gum on closing the mouth, and should consist in the application of a leech to the gum, and in the exhibition of a saline purgative, or of an aperient pill composed of six grains of compound extract of colocynth, three grains of calomel, and three drops of oil of carraway, to be taken over night.

If the inflammation is reduced by these means, and neither pain nor tenderness remain, and the tooth has become comparatively firm, an astringent lotion, as follows, may now be employed to fix it: Dissolve one drachm of alum in a pint of water; to this add one ounce of tincture of rhatany. Dilute this lotion with warm water, and wash the mouth with it three or four times a day.

On the other hand, if the disease has proceeded without recourse to proper remedies, or has been irritated and increased by *improper* applications, as creosote, oil of cloves, or any other strong stimulants, it then becomes imperative to remove at once the exciting cause, viz., the decayed tooth or stump. After this, the application of a roasted fig, or of warm water, will generally suffice to complete the cure.

The presence of a stump may generally be regarded as the cause of this complaint, where the crown of a tooth has decayed, or has been broken away in the effort to extract it.

The following cut exhibits a case of alveolar abscess with exfoliation, arising from irritation.



In certain cases, particularly where treatment has been delayed, or improper applications employed, exfoliation takes place, and considerable loss of substance may result. The following cut represents a case of the kind that occurred in a child; in which the alveolar process of the front deciduous molar and of the left permanent incisor has exfoliated.



Whenever pain or tenderness is felt in one or more of the teeth, the symptoms being similar to those we have mentioned, the sufferer should lose no time in consulting a dentist, who will at once carefully examine and *sound* the teeth, so as to ascertain the nature of the complaint before it is too late. Should it happen that the services of a dentist cannot be obtained, the remedies above

described may be used with a good prospect of success.

When the disease of which we are treating exists in the upper jaw, it may assume a most serious form, particularly if it be caused by the irritation of a decayed tooth opposite the antrum. If a case of this kind be allowed to proceed, total destruction of the face, and fatal consequences, may be the result.

The formation of abscess in this cavity might, however, in almost every instance, be prevented by the timely adoption of proper treatment. On the occurrence of severe, deep-seated, and throbbing pain in the upper part of the alveolar ridge, or just above it, in the region of the antrum, such as has been described as attending the formation of abscess in this cavity, or in that of the alveolus of a superior molar; or if the tooth directly beneath the place where it was first felt, be considerably decayed, or its lining membrane exposed; or if it be dead, loose, or its socket much diseased, it should be im-

mediately extracted. By this simple operation, the formation of abscess, not only in socket of the tooth, but also in the antrum, may in almost every instance be prevented. If, however, it be not followed by an immediate subsidence of pain, leeches should be applied to the gums and fomentations to the cheek. If the patient be of a full habit, and if there be any general febrile symptoms, saline purgatives may also be employed with advantage. But in the majority of cases, the extraction of the tooth will be all that is required to arrest the progress of the disease." (Dr. C. A. Harris, *On the Diseases of the Maxillary Sinus*; page 463.)

Once more then let us urge the necessity of immediate care in this disease, which, however trivial it appears at first, may turn out, by even short neglect, to be fearfully dangerous and destructive.

FILING.

The operation of filing is one that the practical dentist is almost daily called upon to perform, and from which, if it be judiciously and effectually employed at the commencement of disease, the most beneficial results may be expected.

In consequence of a crowded state of the mouth, of the premature developement of the teeth before the maxillary arch is large enough to admit them, or else of uncleanness, the permanent central and lateral incisors in the upper jaw frequently decay at their sides at an early period; and hence it is that these, together with the canine teeth in the same jaw, demand the use of the file more frequently than the other teeth. It may, however, be successfully employed on the bicuspid and molar teeth, either upper or under.

Caries arising from any of the above causes, if allowed to extend beyond a certain limit, renders the operation of stopping diffi-

cult to the operator, and hazardous to the tooth, owing to the confined space in which the stopping instruments must be used.— This difficulty is of common occurrence, particularly where the disease has advanced to the cutting edge of the tooth; and it makes it impracticable to form a cavity of proper size and shape to retain the metal. Even should it be surmounted to the operator's satisfaction, the walls of the cavity will most probably be broken down in the attempt to stop it, or the stopping will fall out in the course of a few months.

In cases requiring the use of the file, the dentist ought not, in our opinion, to content himself with merely dividing the teeth, but should continue the operation until the *whole* disease is eradicated, and the affected tooth has as white and smooth a surface as its sound neighbours. Where the operation can be managed, a considerable portion of a tooth (especially of the posterior part) may be taken away without perceptible disfigurement, and without making matters worse in

the mouth. Undoubtedly we are no advocates for the removal of the enamel, which is the natural covering of the teeth ; nevertheless necessity frequently compels us to resort to it as the only means of preservation. It is not requisite to use the file in all cases ; in some the disease may be simply *scraped* away.

The teeth are more highly organized in young than in old subjects, and hence it is that the former are generally more liable to suffer pain from the operation of filing.—Where this is the case, the operation may be deferred for a few days, and the parts treated in the manner we shall hereafter mention.

We find the teeth best adapted for the use of the file, to be the four front incisors, the canines, the bicuspid, and, if their position be favourable, the molars. In the latter, however, the caries has for the most part gone too deep before the patient discovers it, for the file to be available. Still it may be prudent to attempt the treatment by filing, though success is very uncertain, but where

this fails, the teeth may notwithstanding be preserved by stopping.

The manner in which incipient caries between the two laterals or centrals may be removed with as little disfigurement as possible to the front aspect of the teeth, is as follows. First make a clear division down to the gum with a moderately thick file : then remove the caries from the back of the tooth with a bent scraper ; and meanwhile support and steady the teeth with the left finger and thumb.

Having removed the caries, the dentist is next to employ a finer file to take off any roughness left by the first filing, so as to prevent foreign substances from lodging in the part ; and he is then to employ a third and still finer file ; and lastly, to polish the surface by means of a piece of common cane, with chalk and finely-powdered pumice-stone. If pain occur during the operation, he should immediately desist, and postpone it for a few days, and endeavour to allay

irritation by occasionally applying a mixture of spirits of wine and morphia, as follows :

R Spt. Vini Rect., 3 drs.

Acet. Morphiæ, 3 grs.

Mix.

After the operation is completed, we always provide our patients with a piece of soft pine-wood, shaped as a tooth-pick. This we request him to use evening and morning, to maintain the polish we have given, and to remove extraneous matter from the surface of the tooth ; as otherwise such matter might produce a recurrence of the disease.

Notwithstanding precautions, caries will sometimes renew its attack on the same tooth, but generally on some other part than the one already treated. Where such an event occurs, it is to be attributed to a general defect in the structure of the tooth.

CHAPTER IX.

SALIVARY CALCULUS OR TARTAR.

TARTAR is a peculiar earthy deposit found almost universally on the teeth of all classes, ages, and constitutions. Some physiologists affirm it to be a peculiar secretion; among whom M. Serres is conspicuous, from having asserted that it has its own proper secretory glands. Jourdain thinks that it is secreted by glands scattered over the periosteum of the teeth. Others contend that it is nothing more than particles of food first dissolved in the saliva, and afterwards deposited on the teeth and other immovable parts, whether natural or artificial, within the cavity of the mouth; being constantly formed on the gold, ivory &c., used in the formation of artificial teeth. It occurs however more particularly on the parts adjacent to the salivary ducts, as at the back of the lower incisors and on the outer surfaces of the upper molars.

The tartar formed principally of inorganic phosphate of lime, is originally deposited over the whole surface of the teeth alike, whence it is removed from the prominent parts by the action of the tongue and lips. It has often been analyzed chemically. The results have been various, owing no doubt to a difference in the character of the deposition itself.

According to M. M. Vauquelin and Languor, tartar is composed of

Water	7 0
Salivary Mucus	13 0
Phosphate of Lime with some traces of Magnesia	66 0
Carbonate of Lime.....	9 0
Animal Matter, soluble in muriatic acid.....	5 0
	<hr/>
	100 0

Berzelius gives the following :

Salivary Matter	1 0
——— Mucus.....	12 5
Phosphate of Lime and Magnesia	79 0
Animal Matter soluble in muriatic acid.....	7 5
	<hr/>
	100 0

Under the microscope, tartar is seen to consist of numberless fossil animalcules embedded in, and intermixed with, the earthy phosphates and the other matter of which it is formed.

If a piece of tartar be taken from the mouth of a person who has fasted for some time, and from that part of the neck of the tooth embraced by the gum, and if it be submitted to the microscope, it is said a number of these animalcules will be discovered, and their *debris* not only contributes to produce the tartar, but occasions the disagreeable fetor that so often attend any large accumulation of this substance. There are, however, several kinds of tartar, differing from each other not only in colour, density and chemical composition, but also in their effects on the teeth and the other parts with which they are in contact.

Thus, there is a soft tartar, of a chalky consistence and light brown colour, which is generally found to accompany that delicacy

of frame and skin which indicates a strumous or consumptive habit.

Another kind is met with, of a dark colour, approaching to black, much harder in consistence than the former, and which adheres firmly to the teeth, is much slower in depositing, and in time acquires an almost crystalline character.

There is also a third kind, less common, however, than the preceding, but far more destructive in its effects. It is generally of a dark green colour, and small in quantity, but causes erosion and scaling off of the enamel.

The saliva itself sometimes assumes an acid character, and produces a slow and soft decay of the teeth. Occasionally those on one side of the mouth fall victims to this decay, and in many instances even the ivory plate of a set of artificial teeth is corroded on one side more than on the other. This arises no doubt from the secretion of one parotid gland being vitiated, while that of the opposite gland continues healthy.

The eight or ten varieties of tartar described and individualized by some authors, are but modifications of the three above mentioned, and are produced by the effect of medicines, by the constant use of tobacco, or by the stain of port and other wines, producing a difference in the colour and appearance of this substance.

The *first* kind of tartar then may be described as a chalky mass, having a slightly alkaline taste, and varying somewhat in colour, according to the habits of the person in whose mouth it is found.

The *second* is hard and firm, of considerable density and of a dark colour, and adheres to the teeth with great pertinacity.

The *third* kind is a thin film of matter of a greenish colour and very acrid character.

As far as the teeth are concerned, the first kind is perfectly innocent, for on its removal the surface of the enamel and the teeth themselves will be found uninjured

Tartar is first deposited as a soft earthy matter, which becomes coherent by the

agency of mucus and saliva, and occupies the angles formed by the edge of the gums and the necks of the teeth. If it be allowed to remain, it soon grows hard, and is a constant source of irritation to the gums, the edges of which gradually become inflamed and thickened, thus forming a ledge for a larger quantity of the deposit. This accumulates in every direction, upwards towards the crowns of the teeth, and downwards towards the gums, as well as between the gums and the teeth.

In some cases the accumulation takes place to such an extent, that the fangs are exposed, and the teeth themselves are only kept in their places by being cemented by the tartar to the adjoining teeth, and by the cord of vessels at the end of the fang, which then are much enlarged and form a strong and tough ligament.

It is clear therefore that tartar, however harmless in some respects, should never be left undisturbed, since its mechanical action and the inflammation it produces on the

gums and alveolar processes, will sooner or later destroy the teeth.

Some patients, it is true, object to the removal of this substance, although a source of inconvenience and injury to themselves, and of annoyance to others from the offensive smell which it gives to the breath. To such we would remark, that the operation of scaling is the most simple and innocent imaginable, and unaccompanied by pain; being in fact but the removal by appropriate instruments of an extraneous substance, which the tooth-brush is inadequate to bring away. But of this we shall speak more presently.

The third kind of tartar appears originally as a discoloured arch around the fronts of the teeth, close to the edges of the gum. It should be removed at once, and the enamel under it well polished, to prevent its re-deposit: otherwise it will repeat its attack on the enamel, and completely denude the teeth, the crystalline appearance of the enamel being destroyed, after which the sub-

jacent osseous substance will suffer, and soon become carious.

The following engraving represents the loss of the four central teeth of the lower jaw from the accumulation of tartar.



The next cut represents the teeth of the lower jaw completely imbedded in tartar.



When tartar is present, there is more or less congestion and tumefaction of the gums, which acts as a powerful cause of injury to the teeth.

SCALING.

When tartar has accumulated on the teeth, it is essentially necessary, as we said before, that it should be at once removed. The operation of removing it must be performed with great care, and without any violence, for otherwise the enamel may be chipped or injured, and premature decay of the teeth ensue. As a rule, the patient ought to feel no pain during the operation.

The modes of using the scaling instruments will be readily suggested to the operator by their respective shapes.

When by their successive application the whole of the tartar has been removed, the teeth should be gently rubbed with a piece of pine wood or cork, dipped in tooth-powder. This is necessary in order to remove the roughness that is always left, in consequence of a small piece of tartar escaping the instruments, and which, if it were not removed, would serve as the nucleus for a fresh deposit of the same kind ; and more-

over would communicate a very unpleasant sensation to the tongue.

In cases where the accumulation of tartar is so great as to cause inflammation and turgidity of the gums, with loosening of the teeth, it is well to remove a portion only at one sitting (and this, with more than ordinary care); and then to wait a few days until the teeth and gums have recovered from the first operation. In the meantime, much benefit may be derived from the use of some astringent lotion :—

Add a teaspoonful of this lotion to half a tumbler of water, and brush the teeth and gums with it two or three times a day.

If the gums are tender and spongy after the tartar is all removed, the use of the same lotion may be continued. Indeed, in all cases in which tartar has been removed, it is expedient to use the above lotion as well as tooth powder (not containing acid) once at least during the day.

It is to be regretted that there are persons calling themselves dentists, who are in the

habit of employing some one of the dilute mineral acids to facilitate, as they express it, the operation of scaling. This unprincipled procedure dissolves the enamel and earthy parts of the teeth, and makes them beautiful and white for a few days, at the expense of their total ruin in less than a twelvemonth afterwards.

The operation of scaling is in itself all-sufficient for the purpose that it is intended to answer.

GUARDING THE TEETH AGAINST ACID MEDICINES.

We have just referred to the pernicious effects which the dilute mineral acids may exert on the dental organs. Now these acids are occasionally given internally as medicines, and are frequently ingredients in gargles and lotions for the mouth. But from what has been already stated, it is obvious that they

cannot be long used thus without doing great and often lasting injury to the teeth. To prevent this, the dose about to be taken is sometimes placed in a glass tube, which is emptied of its contents at the back of the mouth. This however is an unsafe expedient, for the tube may break, and wound the adjacent parts; nor does it fully answer its purpose, since some of the acid is sure to mix with the saliva, and thus to diffuse itself over the whole mouth and teeth.

The best method to avoid the hurtful consequences arising from the exhibition of these acids, is to place in the mouth a few pieces of gum-arabic, or a piece of jujube paste, some minutes before the medicine is taken, distributing the mucilage over the teeth by means of the tongue: then, quickly swallowing the medicine, immediately to wash out the mouth with water in which a small quantity of carbonate of soda or potass has been dissolved. In this case the vegetable gum sheathes the teeth without the acids being enabled to act upon it; after

which, the alkali (soda or potass) neutralizes any small quantity of acid that may remain in the mouth, and that, when the mucilage is washed away, would otherwise injure the enamel.

CHAPTER X.

EXTRACTION.

THE operation of extraction should never be resorted to in the early stage of caries, or until all other means have failed, or the surrounding parts are so diseased that it would be hazardous and useless to persist in filling the tooth, with the view of making it available for future use. Bushels of teeth are, we fear, taken out, without proper forethought. But the dentist ought to be deeply impressed with the responsibility of his calling; and ought always to lean to the belief, that the teeth, like the rest of the frame, are meant to last for life, however the intentions of nature may be contravened by luxury, deleterious medicines, or want of early attention to cleanliness. At any rate he, the preserver of the teeth, should never debase his art, by making it consist entirely in the dexterous use of the forceps.

There are, however, many cases in which extraction is quite necessary, and in which it is the practitioner's duty to decide what instrument is best adapted to remove the tooth with the least amount of pain and danger to the patient. We have found the forceps the most suitable and safest instrument, and had never any occasion to use the key.

CHAPTER XI.

NERVOUS AFFECTIONS OF THE FACE FREQUENTLY MISTAKEN FOR NEURALGIA OR TIC DOULOUREUX.

WHEN we have considered the intimate connexion that subsists between the nerves of the teeth and those of the head, neck, brain, &c., it will be scarcely surprising that nervous affections of the face are frequently mistaken as to their character, and treated as if they were constitutional and not local complaints. The fact is that comparatively few cases of true constitutional neuralgia are to be met with, though thousands are treated as such, which, if the teeth were closely examined, would be found to depend on deep-seated stumps, that possibly may have lain hid under the gum for years, and there have escaped the observation of both the patient and his medical attendant. Moreover, carious teeth will often cause an attack of

neuralgia, perhaps in the face or neck, or at some considerable distance from the source, viz., the affected tooth, which at the time may itself be free from pain. Derangement of the digestive organs may, and doubtless frequently does, give rise to neuralgic affections; yet in ninety-nine cases out of a hundred such affections are grounded on the irritation of a diseased tooth, excited either by exposure of the nerve, or else of the upper part of the teeth in consequence of the recession of the gums, or by a diseased fang: and they are at first purely local in their character. After a time, it is true, general and constitutional symptoms set in, but even then the removal of the diseased tooth, or proper treatment of the fang, will frequently both put an end to the paroxysm, and prevent its return.

Medical authors assert, that genuine neuralgia may be known by the periodicity of its attacks; but this, like many other imperfect generalizations, has led the mind away from profitable observation; and caused the

profession to disregard those diseased organs which are frequently the exciting and palpable sources of the nervous affections now under consideration. In consequence, the medical practitioner too often neglects an appeal to the teeth in cases where a proper examination, instituted before the disease has assumed a formidable character, might at once point to the relief of the patient by suggesting a removal of the cause of the suffering.

There is an absolute necessity in cases of facial pains, for an examination of the teeth by a dentist, before any mode of treatment is decided upon.

CHAPTER XII.

VALUE AND IMPORTANCE OF THE TEETH AS CONNECTED WITH HEALTH, ETC.

HAVING pointed out as concisely as possible the various diseases to which the teeth are subject, and the modes of treatment, we shall now give a brief summary of the relations that these organs and their functions bear to health, comfort, personal appearance, and enunciation of speech.

And first as regards health. Before the food is taken into the stomach, it is necessary that it should be comminuted, and mixed with a portion of saliva, so that afterwards it may be regularly and perfectly exposed to the action of the gastric juice.* Now the

* "It is estimated that about six ounces of saliva are secreted during the average time of a meal. It flows in greater quantity when the food is acrid and stimulating. It mixes with the mucus copiously se-

teeth are instruments by which this comminution is affected. Perhaps we cannot better illustrate the importance of the process, than by comparing the human teeth with those of the different kinds of animals that feed on vegetable matter, and are either graminivorous, or herbivorous, or both. Let us, for this purpose, take the cow as an example.

This animal feeds hastily; to balance which circumstance, nature has provided it with more than a single stomach or receptacle for food. The stomach into which the food is first taken, has the power of returning it to the mouth, there to undergo a second and more perfect mastication, called rumination, or in common language, chewing the cud. After this the mass is fit for the true

creted from the glands, and with the serous fluids exhaled by the exhalent arteries of the mouth. There can be no doubt that the saliva, mixing with the food by the motion of the jaws, absorbs oxygen, and unites to the alimentary substances a quantity of that gas fit to bring about the changes they are ultimately destined to undergo." (Richerand's *Physiology*, p. 96.)

stomach, where its conversion into nourishment commences.

In animals of this class the incisors or cutting teeth are thin and sharp, whereby they are enabled to crop the shortest grass, and to fill the stomach quickly; while the molars have large surfaces for effectually grinding the food when submitted to their action.

An equal necessity for perfect mastication exists in man, and thus the teeth, on which this depends, ought of course to be in a sound and healthy state. In fact, the provision that nature maintains for animals, cannot be impaired in human beings without interfering with their bodily health and comfort. When the teeth are imperfect, the food cannot be either properly comminuted, or thoroughly mingled with saliva. The consequence is, as we before hinted (see page v), that the sense of taste is very imperfectly exercised upon the nutrient materials, when yet this sense is in a manner stationed as an outward guard over the whole series of

digestive apparatus. For common experience shows, that while objects remain of a certain size, they are amenable only to the sense of touch, but not to that of taste, which is a finer or more particular touch, and requires a minuteness in its objects before it can appreciate them. This we all know from the fact, that pieces of food when first taken into the mouth, though *felt* by the lips, tongue, &c., are hardly *tasted* at all, but that they yield their taste precisely in proportion as the teeth act upon and reduce them. The analytic operation of the teeth is, therefore, so far as solid bodies are concerned, the needful precursor of gustatory sensation. This operation is, on this account, one of the highest administrative offices that the teeth perform in the animal economy, without which the food would intrude itself in gross morsels into the stomach, and give rise to another evil consequence than that of deficient gustatory sensation, viz., indigestion, with its concomitant evils.* Moreover if

* L. S. Parmly, *Lectures on the Natural History and Management of the Teeth*, p. 21. 8vo., London, 1820.

the first part of the digestive process be not properly performed, the succeeding ones will be imperfect ; and all this, because the teeth are defective.*

We have said that the teeth enable the food to become an object of the sense of taste, and it is equally true that they themselves are the sensories, or, at all events, the transmitters, of a fine and peculiar sense of touch. To be convinced of this we have only to recollect the pleasurable feeling associated with the comminution of many substances, some of which have but little taste, as nuts of all kinds, &c., &c., which have a singular effect upon the the teeth. This sense appears to be something intermediate

* Dr. Fitch attributes dyspepsia or indigestion to a diseased state of the teeth, preventing a proper mastication of the food ; and to the ulcerated and putrid matter which passes from the teeth and gums, along with the aliment, to the stomach. He also says that the irritation produced by diseased teeth is often so great as to disturb the healthy functions of the system, and of the stomach in particular. (*On the Teeth*, p. 308.)

between touch and taste, and to explore the food by a middle feeling between that of the lips and that of the tongue. Its existence is often disagreeably proved by small pieces of cinders, little stones, and the like, coming between the grinding surfaces of the teeth, and which are most nicely apprehended by those organs.

It will not be disputed that perfection or imperfection of the teeth makes the greatest difference in the personal appearance of the individual. The loss of even a single front tooth spoils the symmetry of the mouth; but when the whole are gone, and the alveolar processes absorbed, two or three inches are taken from the length of the face; the nose and chin approximate; the skin runs into huge gathers and deep furrows; the cheeks protrude, the mouth loses its smile, and under these circumstances, the sweetest face becomes senile and deformed: we will not say ugly, because if the mind be well disposed, its amiability will still shine forth from the ruins of the physiognomy.

The engravings on page 154 represent the same face with and without teeth.

Furthermore, the teeth are of great importance as organs of articulation; not less so indeed than the lips and tongue, which act in unison with the teeth in speech; the vibration of the tongue, especially, as it strikes against the teeth, producing many of the sounds of the human voice. This office of the teeth is well remarked upon by Aristotle, who says that the "character and number of the teeth in man are mainly ordered with a view to speech," and that "the front teeth contribute in a remarkable manner to the utterance of several of the letters of the alphabet."* To demonstrate this experimentally, the reader has only to pronounce the words "the," "therefore," "those," "they," or "that," and he will perceive the vibratory action of the tongue against the teeth, and the manner in which the lips modulate the sound, and give it definite expression. Or again, he may ob-

* "De Partibus Animalium," lib. iii., cap. i.

serve the same words when uttered by persons -who have lost their front teeth; when the effect will be found to resemble that which would be produced by a person speaking through a wooden tube.

And as the teeth contribute to the articulation of the voice, so they also transmit the voice to the ear of the individual uttering it, and give a loudness and distinctness to the sound as apprehended both by the internal and external auditory passages. This is readily proved by the familiar experiment of holding a poker between the teeth, having previously closed the ears, and applying the other end of the poker to a boiling kettle; in which case the sound of the ebullition is conveyed through the teeth to the ear and head with the greatest clearness. It is impossible to do other than conclude from this, that whatever sounds strike upon the teeth, are at once conveyed by them to the ear, and perhaps to the whole cranial sounding board. And this may be one reason why those who are deaf, open their mouths to

catch sounds by way of the internal ear; an action which is generally referred entirely to the presence in the mouth of the Eustachian tube, but which we are inclined to think depends also upon an instinctive feeling of the manner in which the teeth carry sounds to the auditory organs.

Hence it is that disagreeable sounds are said to "set the teeth on edge:" a fact respecting which many curious idiosyncrasies are observable. Many persons are affected in the most painful manner by the sound of cinders under the fire-shovel, &c., &c.: clearly proving that the teeth perform some universal offices as transmitters of sound; and which indeed are proverbially though not yet physiologically recognized; for common sense runs faster than science.

Such are a few of the wide offices of those humble and sometimes despised and neglected organs, the human teeth. Themselves organs of sensation, they contribute indispensably to the sensation of the next higher organ in the same series, viz., the tongue.

And by the same act, we mean the comminution of the food, they perform what may be called the first digestion, which is necessary to the proper performance of the second digestion, or that of the stomach. Moreover, they build the face into beauty in woman, and manliness in man; wonderfully completing both the softness of the feminine expression, and the firmness of the male. And if they give beauty to the face, they are also beautiful themselves both in form, colour and lucidity, so that the poets have well likened them to pearls, and spotless ivory and alabaster. Nay, their uses are higher or more intellectual still, for they have a share in forming the voice, which is the distinctive of the one being who is endowed by the Creator with a will and understanding; and thus they stand in that series of mechanism which brings the intellect into physical expressions, and enables man to converse with man, and to institute societies; which enables the orator and the preacher to guide and sway the minds of others; which utters

truths, and communicates affections. Lastly, they contribute to give the speaker himself a clear hearing of his own voice, and thus to bring down self-consciousness into the lowest sphere, and to enable us to acquire intonation, and the utterance of our thoughts, with the greatest perfection.

All these uses clearly demonstrate that the teeth, like the body and its organs generally, are a trust, for the proper maintenance and administration of which we are deeply responsible : they also show, that by regarding the teeth from the purposes they serve, we may have higher views of them, and appreciate their importance more correctly, than could be the case if we based our induction simply upon their anatomy, physiology, and microscopic characters ; neglecting the broad and common-sense facts we have stated above. Wherefore although we justly value the contributions of the anatomist to dental science, yet we hold that the eyes of the anatomist and microscopist require to be armed by a recognition of the great and

practical effects which the teeth produce ; after which they will be more competent than now to look upon many knotty questions, such as the organization of the enamel, &c., &c. Let us now then neglect the broad features of our case, which are, after all, the most instructive, and the most nearly allied to the *practice* of our art.

THE MEANS OF PRESERVING THE TEETH.

Notwithstanding the considerations adduced in the preceeding section, and with the main details of which almost every one is acquainted, yet few persons are induced to acquire that easy knowledge which is necessary to effect the preservation of the teeth, or if they do acquire it, few are found to follow it up with the diligence requisite to success. Probably they so far sacrifice to cleanliness as to brush their teeth once a day, but having done this, and being satisfied

that the teeth perform their duties for the present, no pains are taken to ensure their services for a prolonged future, or to prevent them from falling into dilapidation which renders them worse than useless. Too often, for instance, a dentifrice is used that makes the teeth white for the time, but at the expense of tooth-ache and decay in the time to come; or tartar is allowed to accumulate, or the beginning of caries is neglected, &c. Were it possible for us to impress upon the public the importance of care and attention to the subject, to cause them to avail themselves of proper precautions for the preservation of the teeth, and to convince them of the need there is for a periodical visit to the dentist, we are sure that a large amount of pain and misery would be avoided, and many teeth would last for life, which are at present sacrificed before manhood even commences.

The reluctance commonly felt by patients to apply to the practitioner, is, we admit, unfortunately grounded in many cases upon

a knowledge of the unprincipled acts of some of those usurious pretenders who disgrace the dental profession. Numerous individuals are afraid, and not without justice, to place themselves under the dentist; they have perhaps had sad experience already of the "tender mercies" of a certain class of operators, or they have heard accounts, too authentic to be doubted, of suffering and injury undergone by their immediate friends and relatives. Thus the whole profession, (and with it the public) suffers for the improprieties of a few of its members; and a benign art becomes a bugbear to those whom it is intended to benefit. Nothing can altogether remedy this but an improvement in the profession itself, by which it shall purge itself of that dross which it at present contains. In the meantime we beseech the public not to throw away a real good because it has been abused, but to be more than ever careful in the choice of their dentist, valuing character more than either cheapness or notoriety. If they do this, they will have

in their own hands the power of commanding justice and skill whenever they require them.

Actual pain is too frequently the only thing that will compel the patient to apply to his dental adviser, and many a valuable tooth is ruined on this account. For the teeth differ somewhat from other organs, inasmuch that in them disease may have made considerable progress before pain is urgent. So long as decay is confined to the enamel and bone, the patient is not aware of the ravages that are going on, and probably not till such decay has destroyed the bony substance, and exposed the internal cavity of the tooth, is his attention called to the subject.

We advise that children should be early habituated to take care of their teeth, in order to insure proper attention to them in after life.* At five years old they may begin

* "It is a religious precept," says Tournefort, in his 'Voyage to the Levant,' "among the Musselmen, to make a little ablution with the face turned towards Mecca; to rinse the mouth thrice, and clean the teeth

to use a tooth-brush, which should be employed at least once a day. This brush must be of middling firmness.

Particular regard should be paid to the grinding surfaces of the double teeth as they make their appearance in the mouth, for their unevenness often causes them to retain particles of food, and thus makes them very subject to decay. These teeth require a rather hard brush with long elastic bristles, which should be used after every meal, to remove any remains of animal or vegetable matter before decomposition commences.

The lateral edges and posterior surfaces of the teeth also require great care, as particles

with a brush. This shows how highly this custom is esteemed among a people, who formerly were forbidden, according to Menavius, to have a tooth extracted without permission from the emperor. Let children be taught by their parents the proper degree of care necessary for their teeth; they generally imitate them even in their sports; here the agreeable lesson will be converted into a useful habit." (Duval, *The Dentiste de la Jeunesse*.)

of food and deposits of tartar are apt to lodge between them. To cleanse these parts effectually, the brushes must be moved not only across the teeth, but upwards and downwards, confining the action to no one particular direction.

The bristles ought to be sufficiently long and elastic to penetrate into the interstices between the teeth. The opinion that using a brush with this intent removes the gums from the necks of the teeth, is erroneous; the fact being, that where the gums are relaxed, spongy, and liable to bleed, the above is one of the best means of restoring them to healthy action, and causing them to adhere more firmly.

As we before observed, the teeth should be cleaned and brushed after each meal.— A suitable tooth-powder should be used at least once a day, the best time being in the evening. Occasionally the gums should be brushed with a little spirits of camphor, or eau-de-Cologne, or tincture of Myrrh,

which may be dropped on the brush, and applied after the tooth-powder.

In cases of irregularity it may be difficult to keep the teeth clean by means of a brush alone: and the end may then be answered by a piece of wood, cut to the shape of a wedge. This will be found available in situations that are not to be reached by a brush.

Those who wish to preserve their teeth should on no account use a *metallic* tooth-pick. If it be necessary to use one at all, those made of quill, and sold at the stationers' shops, are the only safe ones.

When the gums are tender, or the teeth loose, an astringent lotion should be used twice or thrice a day, in the proportion of half a teaspoonful to a wine glassful of warm water.

Thus the means of preserving the teeth are few and simple, and yet if fully acted upon, they will be found to be efficacious. Cleanliness, in one form or another, embraces them all. Is it too much to require

this of civilized people, who would be shocked at the necessity for the recommendation if it applied to their hands, faces, or other parts of their persons? This much we will say, that the attention which is paid to cleanliness, of the teeth especially, is in exact proportion to the civilization of the individual, or to his height in the social scale. If his teeth are green, brown and stinking; if they are imbedded in tartar, or half eaten up by caries, his feelings must be blunt indeed if he can go into society without knowing that he is an outrage in the eyes and noses of his acquaintance. The *moral* of such a person requires serious correction. As "cleanliness is next to godliness," so *his* uncleanness is akin to considerable perversity. Let him by all means mend his manners; apply to his dentist to have his teeth set right; bestow due pains afterwards to keep them right; and bring up his children, and influence his friends, to follow well the path of dental rectitude.

PART II.

MECHANICAL DENTISTRY.

ARTIFICIAL TEETH.

WE have hitherto endeavoured to point out, by a variety of considerations, the necessity of retaining the teeth in the mouth as long as possible, and we have suggested all the means we are aware of, to keep them in health, and also to renovate them artificially after disease has actually taken effect. Often, however, notwithstanding the precautions of the patient, and the best efforts of the dentist, these ornaments of the human face are prematurely lost or destroyed, and mastication, the dignity or beauty of the

face,* and the perfection of the voice, seem to be gone beyond recall. What is to be done under such afflicting circumstances? Is the dental art beneficent enough to furnish a substitute for these invaluable organs; a remedy against the annoying and sad consequences of their removal from the mouth? Are health, beauty, and utterance indebted to it for so great a boon? Artificial teeth are the answers to these interesting questions

It is right however to warn the patient, that

* For the mouth is not the only feature impaired by the loss of the teeth: all the other parts of the countenance become more or less dilapidated. The nose loses its support; the face, from the forehead downwards, is shortened, and its natural beauty destroyed. A deep pit is formed under the cheek-bone; the lower jaw is drawn upward, and the lips inward; for the fibres of the principal muscles of the face change their oblique direction, and run into the mouth nearly at right angles. Moreover, from the absence of that fulcrum which the teeth afforded to other and antagonist muscles, wrinkles are distributed over the whole surface, completing the picture of deformed and decadent age.

under no circumstances will artificial teeth be equal in use to those given by nature ; for the sense of touch cannot exist in the former ; so that the same modified sensations are not conveyed by them to the nervous system as the teeth themselves never fail to convey. We think it right to state thus much *in limine* ; because the extravagant pretensions which are sometimes made in dental advertisements, and which cannot be realized, tend to bring artificial teeth into discredit, and to prevent the public from reaping the true advantages which they are able to afford.

Although then artificial teeth have not the qualities which some dentists profess, yet it is surprising how comfortable and beneficial they may prove, and how thoroughly, if well adapted, they may serve the purposes of mastication and enunciation.

No department of the dental art has afforded so much scope for quackery and extortion as the preparation of artificial teeth, and on none has there been real in-

genuity and real labour bestowed with such questionable success.

The perfection of artificial teeth depends, firstly, on their being so skilfully adapted to the mouth that they may be worn with perfect ease and convenience.

Secondly, on the manner in which they are fastened in the mouth; for the ligatures frequently employed to fasten them, loosen and destroy the adjacent teeth.

Thirdly, on the suitableness of the materials employed in their construction; for improper materials cause irritation of the gums, ulceration and sloughing of the soft parts; effects that are by no means unfrequent from the employment of gold with a large alloy of copper, of pinchbeck, gilded brass, &c., &c.

Fourthly, on such an adjustment as will give solidity and firmness, and on such a close adaptation as will prevent the lodgement of food between the artificial material and the gum; by which, if it took place, a taint would be imparted to the breath.

Having given an outline of the conditions on which the success of the artificial teeth depends, we shall now proceed to speak of the various kinds of them employed, and of the basis on which they are fixed; for one kind of tooth or base is not adapted for every case; since the health of the patient, the state of the gums, irritability of temperament, the chemical qualities of the saliva, &c., &c., are each modifying circumstances which demand the attention of the dentist, and by a proper consideration of which only, he can ensure success, and comfort to the patient.

Whenever a tooth is lost, its place should be supplied, as soon as possible, by an artificial one, so constructed as to support the adjoining teeth, and to preserve the contour and symmetry of the face.

The best artificial teeth are formed of a kind of porcelain; a vitreous substance similar to that used for glazing china at the potteries. Various mineral oxids are mixed with this substance to give it the different

tinges of the human teeth, which it then resembles with an exactness that it would be impossible to give an idea of. The teeth constructed of it are fixed on gold.

These teeth possess great advantages over all other artificial teeth. They neither decay, change, nor are in any other way affected or acted on by the juices of the mouth or by acid medicines. Moreover they are especially enduring.

Great improvements have been made within a few years in the structure of these teeth. Formerly they were indeed artificial as contradistinguished from natural; for they resembled real teeth neither in shape nor colour. Now they are made of exquisite beauty and correctness.

In cases where it is necessary to supply deficiency of structure arising from absorption of the alveoli, these teeth are manufactured with an artificial gum.

PIVOTED TEETH.

The operation of pivoting teeth may be said to have originated out of one of a more questionable character suggested by John Hunter,—I allude to the transferring of a tooth from one person's mouth into that of another,—an operation that was performed with various results, but which under any circumstances was revolting, and sometimes also dangerous, inasmuch as serious diseases were thereby transplanted with the tooth, and the dentist became chargeable with aggravating the ills that flesh is heir to.

The operation itself was simply what we have stated; the transplanted tooth being retained *in situ* until it grew fixed. It produced so many ill effects, and was found so inefficient in result, that it soon fell into desuetude, and the operation of pivoting arose out of its ashes.

This operation is confined to those teeth that have single fangs, and indeed is seldom performed on any but the front and canine

teeth. When caries has so far destroyed the crown of these teeth that it is impossible to stop them, and they present an unsightly appearance in the mouth, the remains of the crown are either filed or cut off, and the natural canal of the fang taken advantage of, for the insertion of a wooden pin, to which a crown of exact size, shape and colour of the remaining teeth, is fixed and fitted; the pin being gently forced into the natural opening, previously enlarged with a bit corresponding in size with the pivot. Pivoted teeth may, under favourable circumstances, remain for a great many years in the mouth. This operation requires care and judgment to prevent subsequent inflammation and swelling of the face, particularly in nervous and irritable patients.

THE SURGICAL TREATMENT OF THE MOUTH PREPARATORY TO THE INSERTION OF AR- TIFICIAL TEETH.

PREVIOUS to the adaptation of artificial teeth, either upon a gold or silver plate, it is of the greatest importance to the ultimate success of the operation, that the mouth should be in a perfectly healthy condition; for otherwise, however beautiful and correct our artificial apparatus may be, it will be impossible for the patient to wear it with any degree of comfort.

It is, therefore, necessary in all cases requiring artificial teeth, for the operator, before he proceeds to take his impression in wax, to examine thoroughly the condition of the gums, and of any natural teeth remaining in the mouth, and if he finds any loose roots or diseased teeth, to remove them immediately, and defer taking the impression for a period varying from two to six months, so as to allow the subsequent absorption of

the alveoli to be complete. This may be materially assisted by the patient frequently washing his mouth and brushing his gums with an astringent lotion.

In some healthy constitutions the absorption is rapid, while in debilitated subjects it may occupy a longer period than the longest above mentioned.

In cases requiring full sets, and where many diseased teeth or stumps have been removed, it will be found, when we come to fabricate our artificial substitutes, that the maxillary arch, after absorption has taken place, is considerably contracted, so that it is impossible to insert the usual number of teeth of the same size as natural on the socket. Again, in cases for partial sets it will also be found, under the same circumstances, that the space has become so narrow, that the loss of room will frequently exceed the breadth of one tooth. In both these cases, the operator should use smaller teeth, commencing from the centre with

teeth of the original size, and reducing the size as he approaches the back of the mouth, so as not to be perceptible to the casual observer. It must be evident, from the above observations, that when artificial teeth are inserted in the mouth too soon after the extraction of stumps or diseased teeth, and before a reasonable time has been allowed to elapse for the absorption of the alveoli or natural sockets, the base on which they are fixed, from the continual pressure exerted in mastication, will invariably render the apparatus liable to lose its perfect adaptation to the gum. Hence it is that a vacancy so frequently occurs between the gum and the plate; a vacancy in which particles of food are deposited, where they not only become a source of pain and annoyance to the patient himself in consequence of their chemical decomposition, but from the same ground, render the breath extremely offensive to others.

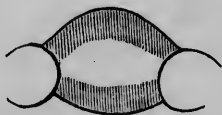
In order to avoid this difficulty and at

the same time not subject the patient to the inconvenience of being without teeth ; we have been in the habit of inserting temporary sets of artificial teeth, which can be worn until the entire absorption of the sockets has taken place, when the permanent sets may be substituted without any risk.

MECHANICAL DENTISTRY.

INSERTION OF SINGLE TEETH ON A PLATE.

THE method usual with some dentists for the insertion of a single tooth, consists in carrying the gold plate only as far as the tooth on each side of the vacancy; while attached to the plate there is a fine gold *wire* that is made to clasp the two neighbouring teeth; as here figured.



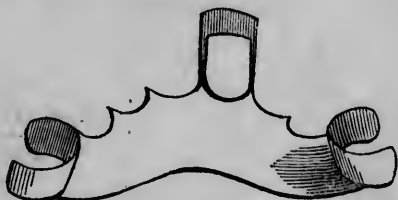
This method of fixing a single tooth, besides being objectionable as showing the gold in the mouth, is also highly injurious to the adjoining teeth, to which the wires are fastened, in so much that by the constant friction of the latter upon the teeth, their

substance is soon destroyed. The teeth are loosened in consequence of the want of solidity and firmness in the artificial substitute, and if a groove is not actually cut into them, thereby exposing the nerve, they are generally lost in the course of a few months.

The important object to be attained, and that the operator should constantly have in view, in constructing artificial teeth, is, to extend his work over such a surface of the gum, that the fastenings by which the teeth are secured, may be far enough back to be quite out of view. The clasp also should be sufficiently wide to distribute the force, and prevent those serious and destructive consequences that result from the employment of wires.

The plan that we adopt and recommend for the insertion of a single tooth in front, is, to extend the gold plate around the sides of the mouth as far as the first molars or bicuspidés, and to attach broad clasps to the ends of the plate. In some cases where no natural division exists between the teeth, it

will be necessary to separate them by means of a file. A tooth constituted on this plan would be as here figured



It may happen that on account of the loss of the teeth on one side of the mouth, an attachment can only be made to a single tooth, or to those of the same side; in the former case the piece would be as follows.



Where the plate and clasp are of sufficient

strength, this arrangement will subserve even the purposes of mastication.

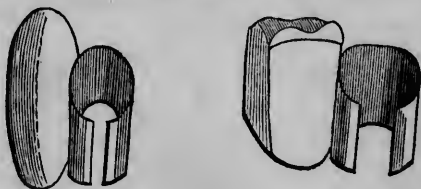
In similar cases it is desirable, where practicable, to take two points for the support of the piece, as here shown.



In other cases, where there is only one tooth remaining for the attachment of the artificial tooth, and where that one is a bicuspid or molar, it is obvious that no great firmness can be gained. Some assistance, however, will accrue from the pressure of the opposing tooth, to prevent the new one from rising in its socket.

The cases where success may be anticipated, are those in which the tooth remaining

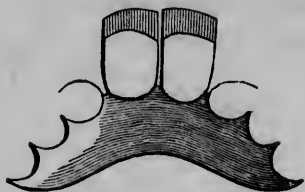
in the mouth is firm and healthy, and of a flat or angular shape, so as to enable the operator accurately to adjust it to his clasp for securing his piece ; in such cases the work will be serviceable for mastication.



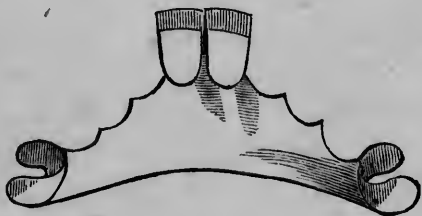
In cases of loss of the first bicuspid, the operator should extend his gold, and make his fastenings to the first molar ; as thus :



In loss of the two centrals of the upper jaw, the method generally adopted is, to secure the piece by means of wires ; thus :

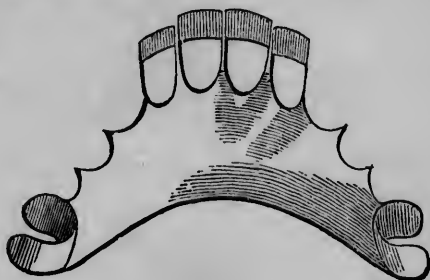


The same objections lie here as in the former instance, against the employment of wires. It is far preferable to secure the piece either to the second bicuspid, or first molar, by broad clasps; as here represented.

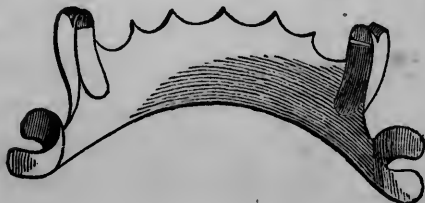


In cases where the four upper centrals are lost, instead of fastening the substitute teeth to the two canines, as is generally done, it is better to extend the gold frame as far as the first molar on each side, so as

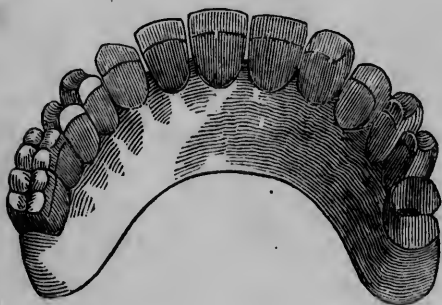
to embrace the neck of each tooth with a strong wide band, as figured below.



Great inconvenience is frequently experienced by patients from having two or more single teeth inserted separately on gold plates, as for example the two first bicuspidis; in those cases, we generally prefer the plan of fixing them on a single plate, as follows.



Occasionally only the first molar remains in the mouth to support a large piece of artificial work. In these cases the gold plate must be run as high up as possible over the edge of the gum, on the side of the mouth, opposite to where the fastening has been made : as here represented.



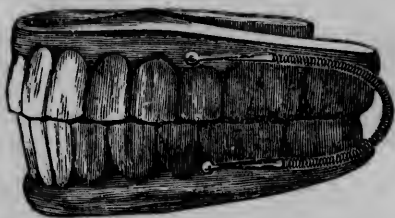
Cases also occur in which only two molars remain ; the gold in this, and similar instances, should extend as far back in the mouth as possible ; inasmuch as it gives steadiness and support to the piece during mastication ; as thus :



Where the whole of the upper teeth are lost, the preferable way to replace the loss, is by means of a suction or atmospheric plate carefully fitted ; such a plate will firmly support the usual number of teeth, and enable the patient to masticate thoroughly every description of food. By such means the voice, and symmetry of the face will entirely be restored.

In cases where the teeth have long been wanting, from age or extraction, the alveolar ridge is much less elevated, than in recent cases or in younger persons, owing to the shrinking of the gums, and gradual absorption or waste of the jaw bone.

To treat these in a satisfactory manner, carved teeth are required, that is, teeth prepared expressly for each individual case, in order to remedy the deficiency in the gum by making an artificial gum as well as teeth; a set of carved or block teeth will have the following appearance.





WITH TEETH.



WITHOUT TEETH.

PRACTICAL REMARKS.

THERE is one fact connected with all organic beings, and which is of peculiar importance in whatever arts or sciences are founded upon the study and wants of the human frame especially; we mean, the fact, that the body is a whole, and that all the parts represent, involve and characterize the whole, and are in the strictest keeping with it. This fact grows out of the unanimity of use that subsists among the parts, and makes them all minister to the general and precise end of the system to which they belong. Therefore it is that the face, in every instance, is the proper face of the individual who owns it, often reflecting his character with notable and accredited correctness. Hence the science of Physiognomy. And therefore also it is that the parts and members of one person are never exactly similar to those of any other person. Reason and experience alike attest that this is the case with the human

teeth. If "quot capita, tot sensus," be valid, so also it is equally veracious to say," quot capita, tot dentes." Hence there may as justly be a science of Dentonomy as of physiognomy; and indeed for the purposes of the dental art, it is highly necessary that such a science should be admitted, and so far as it does not yet exist, that it should at once be instituted. This science, and the art founded upon it, will recognize the manner in which the teeth comport, in their form and qualities with the whole and the parts of their individual possessor, and specifically with his face.

Its practical bearing on dentistry is obvious enough. For though the teeth are small organs, yet are they highly expressive and representative ones, and belong to the most speaking parts of the human system. The slightest observation suffices to show how vast their diversity in different subjects, and how much that diversity adds to the character of the countenance. Thus where they

are lost they require to be substituted by artificial teeth of a similar kind, or at least which will harmonize with the features of the face. In many cases, however, no guide is afforded to the dentist whereby to suit his artificial teeth to the patient, except his own good taste and artistic perception, based upon, and improved by, a scientific habit of observation. And a subtle order of observation it is that is here required ; one which is among the deepest faculties brought into exercise in the whole compass of the dental art.

If it were aught so palpable as a new nose, or a new leg, that was to be adapted to the face or the body in place of a natural member unfortunately lost, it would be at once admitted that, as a general rule, the succedaneous nose should resemble its predecessor, and that if a Roman had been destroyed, a snub should not occupy its vacant seat ; and in like manner that the wooden or corken leg should have some considerable similarity both to the one lost, and to the one

left; so that the stout limb of the porter should not be paired with a fac-simile of the lean and shrunken shank of the clerk; nor the muscular limb of the male, with a resemblance of the rounded and beautiful member of the female. And yet artificial teeth, though comparatively minute, may be as strikingly incongruous with the person of the individual, as even a new nose that subverts the expression of the face, or a new leg that is too long or too short for its unlucky wearer. It is true that in this case the observer may be at a loss to know what feature it is that is so false to the rest of the visage, yet he will certainly have a keen perception that something is very wrong, if he cannot at once determine it. Only let the reader conceive the delicate row of pearls suitable for an aristocratic beauty, inserted into the mouth of an able-bodied, hard-featured labourer, and he will see how widely erroneous a dentist might be, if he did not exercise a discriminating judgment in fitting the teeth

to the individual. And we have no hesitation in asserting, that for want of attention to this subject, the dentist often confers upon his patient an idiotic element of expression, which is particularly manifest during laughter, when the artificial denture grins forth horribly,—a huge mass of insignificant formality, making it impossible for the mind to image itself in the countenance. Such cases violate whatever is even mechanical in the dental art, and reduce the practitioner to something lower than a common carpenter. He may still be competent to make *pegs* for mutilated pensioners, but he should at all events cease to profess to *imitate* the natural parts of that system which is alive, and where harmony is essential.

We are ashamed to say, that in treating of this subject, we know not where to look for written information. Unquestionably all good dentists have had a correct, artist-like feeling which has guided them right, to a certain extent, in practice : but the feeling has not

PRACTICAL REMARKS.

been analyzed, or made the germ of a proper science, as we predict that it will be in proportion as our art advances. Those who go blindly right are apt *sometimes* to go blindly wrong. We must no longer be content with a bare instinct in a matter so vitally important, but distinct observation must be cherished, and thought, and ultimately science, and the rules of science, be founded thereupon. The dentist must divide teeth into certain great classes, and in the same manner, faces also; and paralleling the former with the latter, draw up laws that will, in all cases, enable him, with some confidence, to suit the artificial teeth to the features of the face; and thereby, in a certain logical manner, to the teeth that have perished.

It is little that we can yet do to facilitate the science which we have termed Dentonomy, but the following is at any rate a well-meant contribution, or perhaps an attempt only at a contribution.

In Dentonomy then we at present partic-

PRACTICAL REMARKS.

ularize four kinds of teeth corresponding to four kinds of faces.

1. There is the oval face, and answerably thereto the filbert-shaped teeth, having extremely long enamel, great beauty of appearance, and an oval form at the upper part of their front surfaces, near the gum.

2. The round face; the teeth being short and square; their edges thick and broad, and their front surfaces nearly flat; and the jaws approximating for most part perpendicularly.

3. The third variety occurs in very thin subjects with high cheek bones; the teeth being usually middle-sized, long and narrow; the incisors thin, and the cuspidates rounded and pointed; the bicuspidis pointed, and the molars deeply indented.

4. There are other persons with particularly broad faces; the central teeth also being proportionally broad and thin, and their back surfaces deeply indented; the laterals mostly ill-formed and small; and the canines, bicus-

pids and molars, partaking of the characteristics of the centrals.

We know of no branch of dental study that is more likely than this to reward the attentive observer; of none that will better develop the mind and resources of the novice dentist. It is in fact one of those fine points that must make the difference between the man of talent and the man of mere routine; and characterize the prudent adaptations performed by the one, as contrasted with the rude, *mal a propos* carpentry attempted by the other.

We may be permitted to observe in conclusion, that we by no means wish it to be understood, that the artificial teeth should always imitate the natural ones, even in their defects (as in class four above specified), but only that general characters should be preserved, and in a word, that *keeping* should be ever maintained: so that the Dentist may be, to the proper extent an Artist also.

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DR. DU BOUCHET is prepared to perform any operation, or execute any artificial work in the Dental Profession; he hopes by his particular attention, carefulness and experience, to merit your patronage and influence, which he respectfully solicits.